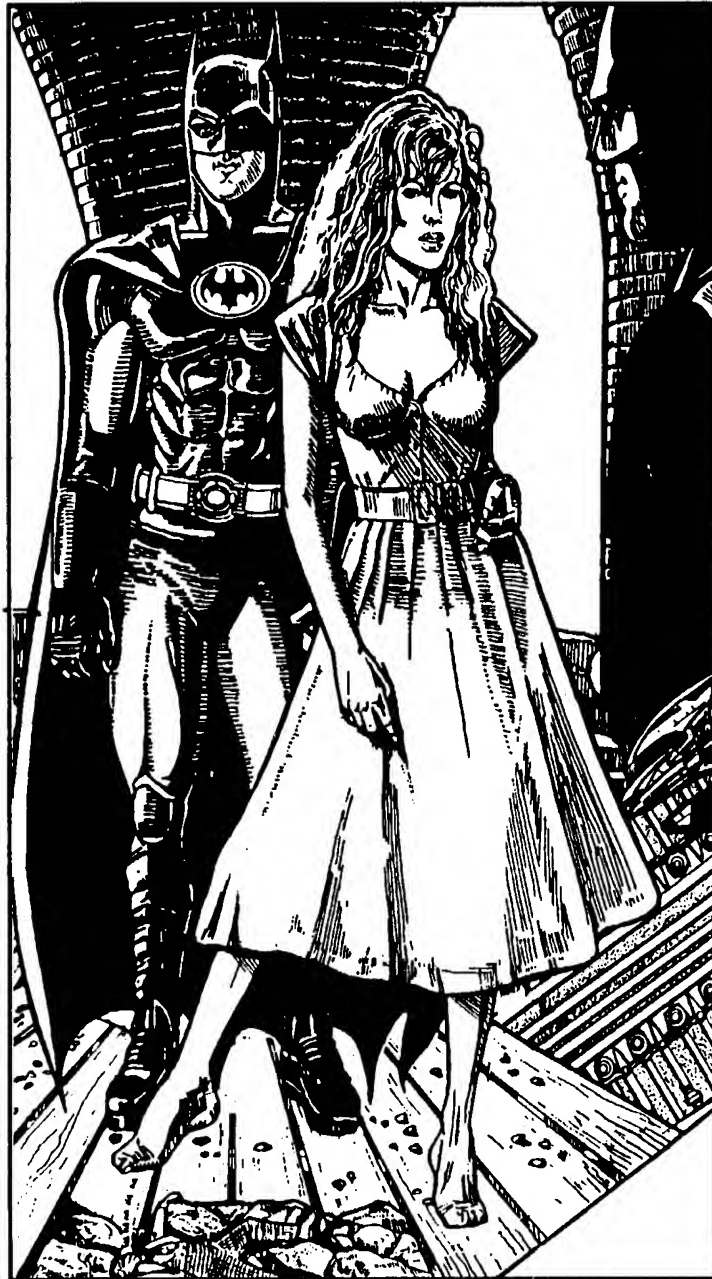




BATMAN



DATA EAST PINBALL®

1990 Janice Avenue
Melrose Park, IL 60160
708-345-7700
FAX 708-345-7718
1-800-KICKERS

CPU JUMPER TABLE

Game	CPU* Version	ROM Location	Jumpers	
			Installed	Removed
Laser Wars	Ver 1	5C	J1b,J3,J4,J6a,J7a,&J8	J1a,J2,J5,J6,&J7b
	Ver 2	5C	J1b,J3,J4,J5a,J6a,J7b,&J8	J1a,J2,J5,J5b,J6b,&J7a
Secret Service	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Torpedo Alley	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Time Machine	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Playboy	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
ABC M.N. Football	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Robocop	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Phantom of the Opera	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Back to the Future	Ver 3	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
The Simpsons	Ver 3	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Checkpoint	Ver 3	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Teen. Mut. Ninja Turtles	Ver 3	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Batman	Ver 3	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a

*Version 1 has a 2K RAM which is a 24-pin IC at location 5D.

*Version 2 has an 8K RAM which is a 28-pin IC at location 5D.

Power-up CPU Self Tests

Upon power-up, the CPU board performs a series of self tests of major components. Turn the game on while observing the LEDs on the CPU board. Tests of the PIAs, RAM, and EPROMs are performed automatically and results of the test are indicated by the PIA LED.

With all tests passed, the LEDs illuminate in the following sequence at power turn-on. The PIA and +5V LEDs illuminate immediately. Approximately 1/2-second later the PIA LED goes out and the Blanking LED illuminates; the +5V and Blanking LEDs remain illuminated until the game is turned off. Test failures are indicated with the PIA LED:

PIA LED

Stays On
Flashes 1 Time
Flashes 2 Times
Flashes 3 Times

SUSPECT COMPONENT

One of the 6821 PIAs
6064 RAM at location D5.
EPROM at location B5.
EPROM at location C5.

QUICK REFERENCE FUSE CHART

PPB BOARD

F1 5A Slo-Blo G.I. 6.3VAC
F2 5A Slo-Blo G.I. 6.3VAC
F3 5A Slo-Blo G.I. 6.3VAC
F4 5A Slo-Blo G.I. 6.3VAC
F5 5A Slo-Blo Flipper Power 48VAC
F6 5A Slo-Blo PPB Solenoids/Flash Lamps (34VDC)

POWER SUPPLY BOARD

F1 7A Slo-Blo +5VDC Regulator Input (9VAC)
F2 7A Slo-Blo +5VDC Regulator Input (9VAC)
F3 Not Used
F4 8A Slo-Blo Switched Illumination Buss (18VDC)
F5 4A Slo-Blo Solenoid Buss (34VDC)
F6 5A Slo-Blo Solenoid Buss (34VDC)
F7 0.5A Slo-Blo Display Reg. Input (90VAC)

BATMAN TABLE OF CONTENTS

GAME SPECIFICATIONS	1
Power Requirements	1
Major Assembly and Fuse Locations.....	1
Circuit Board PROM Locations.....	1
Transportation	1
ASSEMBLY PROCEDURES	1
GAME OPERATION	3
Standard Features	3
Manual Percentaging	3
Game Specific Features	4
AUDIT FUNCTIONS	7
General	7
'Quick Look' Functions	7
Expanded Functions	9
Game Specific Functions	10
GAME ADJUSTMENTS	13
General	13
Replay and Generic Features.....	13
Single-Function Difficulty Adjustments	15
Novelty/5-Ball/Add-A-Ball Rules	15
Game Pricing	16
Additional Generic Features.....	18
Game Specific Features	19
DIAGNOSTIC PROCEDURES	21
Entering Diagnostics	21
Service Credits.....	21
Tech Alert.....	21
Burn In Minutes.....	21
Sound Tests	22
Digital Display Tests	23
Museum Motor Test.....	23
Switch Tests.....	24
Lamp Tests	26
Coll/Flash Lamp Tests	28
Return to Game Over	28
PARTS IDENTIFICATION	30
Cabinet Parts	30
Playfield - Major Assemblies	31
Playfield Rubbers	32
Backbox Parts	32
Playfield Top Parts.....	33
UNIQUE PARTS	34
Ball Shooter	34
Super Vertical Up Kicker(Museum)	35
Super Vertical Up Kicker(Left Side)	35
Flipper Assembly	36
Slingshot Assembly	37
Trough Eject Assembly	37
Outhole Ball Return Assembly	38
Turbo Bumper.....	38
Knocker \ Kickback Assembly.....	39
Turboboost Kicker Assembly.....	39
Diverter Parts	40
VUK Chute (used on Museum VUK)	40
<i>Continued on next page</i>	

Up- Down Switch Assembly.....	41
Target Motor Cam Bracket Assembly	41
Ramp Assemblies	63 & 64
SERVICING DIAGRAMS.....	42
Cabinet Wiring Diagram	42
Combined Display Connections	43
Power Wiring Diagram	44
Backbox Wiring Diagram	45
Playfield Coil/Flash Lamp Wiring Diagram.....	46
Playfield Special Coil Diagram	47
Playfield Switch Wiring Diagram	48
Playfield Lamp Wiring Diagram	49
CPU Board	50
Power Supply Board	55
Digital Stereo Sound Board	56
Display Board	58
PPB Board	60
Solid State Flipper	61

GAME SPECIFICATIONS

POWER REQUIREMENTS

This game is provided with a 3-prong plug and **must be connected to a properly grounded outlet to reduce shock hazard** and insure proper game operation. Refer to AC Power Wiring Diagram for transformer connections required for normal, high, and low line conditions.

Normal Line: 109 to 129 Vac (211 to 225 Vac)

High Line: (226 to 235 Vac)

Low Line: 95 to 108 Vac (200 to 210 Vac)

MAJOR ASSEMBLY AND FUSE LOCATIONS

Refer to the Game Illustration (page 2) to identify locations of the major assemblies, and fuse values and locations.

PROM SUMMARY

CPU Board: Location 5B, 5C

Sound Board: Locations U17 (Voice ROM 1), U21 (Voice ROM 2), and U7 (Sound ROM)

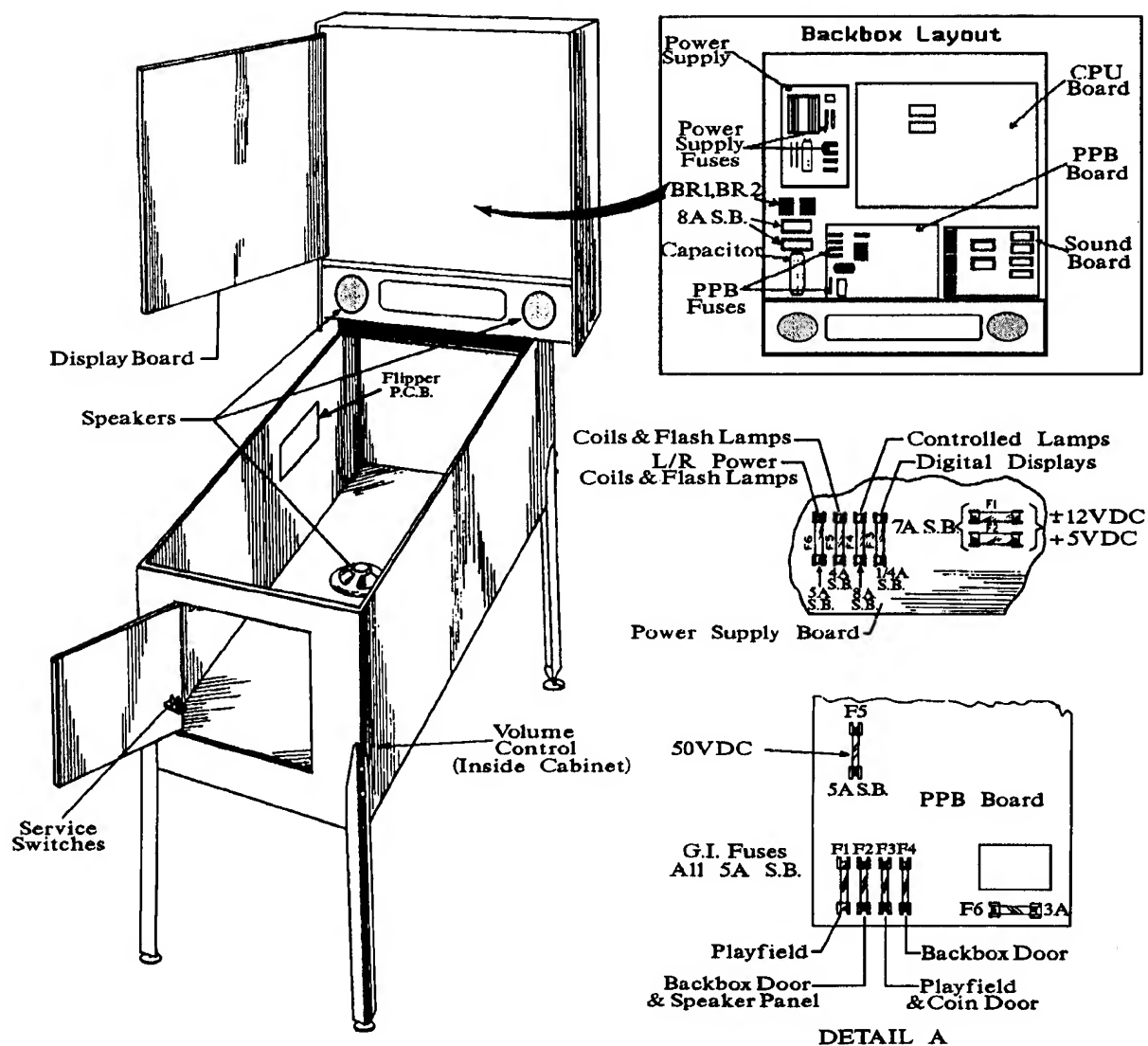
Display Board: Location U8

TRANSPORTATION

To reduce the possibility of damage, observe the following precautions whenever transporting the game. Lower the backbox and secure it to the cabinet. Remove the legs and secure the game within the transporting vehicle.

GAME ASSEMBLY PROCEDURES (Refer to the Game Illustration on page 2)

1. Open the top of the carton and lay it on its side with the bottom of the cabinet down. Using the plastic banding strip as a handle, slide the game out of the carton.
2. Remove all packing material. Locate cabinet legs in filler packing inserts and assembly parts package in the cashbox. There should be four leg levelers, eight leg bolts, three pinballs and a large Allen Wrench used for securing the backbox.
3. Attach leg leveler from the parts package to each leg, make sure that each leveler is threaded through a hex nut before threading it into the leg.
4. Support rear of cabinet and attach rear legs using two leg bolts for each leg.
5. Support front of cabinet and attach front legs using two leg bolts for each leg.
6. While assuring that no cables are being pinched, carefully raise the backbox and secure it in its upright position by inserting the Allen Wrench in the hole in the back of the cabinet and rotating the wrench 270 degrees (3/4 turn).



GAME ILLUSTRATION

7. Remove the backbox keys from the clip on the inside of the coin door and unlock and carefully remove the backglass. Set the backglass aside.
8. Carefully remove the playfield glass and set it aside.
9. Check all connectors in the backbox for loose wire terminations. Reseat any loose wire by pushing in on the terminal.
10. Push on all connectors plugged into the CPU board, Sound Board, Power Supply Boards, and (on Insert board) Display board to check that they are properly seated.
11. Check that the fuses on the Power Supply board, PPB board and fuse panel are seated properly.
12. Raise the playfield and the support bar on the right side of the cabinet; support the playfield by inserting the support bar into the countersunk notch on the bottom side.
13. Check all cabinet cable and playfield lamp board connector terminations.

14. Remove the Plumb tilt from the parts package and install on the panel on the inside left of the cabinet. Note that this game is not equipped with a ball roll tilt.

15. Lower the playfield and level the playfield side-to-side by adjusting leg levelers.

16. Using an inclinometer (protractor) adjust the pitch of the playfield to 6.5 degrees. If a pitch indicating meter is not available, adjust the front levelers to the lowest position and extend the rear leg levelers approximately half way out. Readjust side-to-side level as required.

NOTE

The playfield incline affects difficulty of play. Use the recommended incline; game difficulty is best varied using game adjustments.

17. Check the plumb tilt and adjust as required.

18. If desired, perform any self tests at this time. With the insert door closed, carefully reinstall and lock the backglass.

19. Place the three pinballs on the playfield near the outhole and carefully reinstall the playfield glass.

20. If desired, make game pricing and Add-A-Ball, Novelty, or 5-Ball Play adjustments at this time.

GAME OPERATION

STANDARD FEATURES

Insert coin(s), the game makes a sound for the first credit and generates sounds for each subsequent coin and the Player 4 display indicates the number of credits posted. Depress the credit button and a start-up sound is produced, the posted credits are reduced by one, Player 1 display flashes, Player 4 display indicates BALL 1, and a ball is served to the plunger trough. Additional players may be added by depressing the Credit button before the end of ball 1.

The second closure (adjustable) of the plumb bob tilt switch tilts the ball in play. Closure of the slam tilt switch in the coin door ends the current game(s).

At the end of each ball, earned bonuses are collected. At the end of the last ball for the last player and after bonuses are collected, the system produces a random 2-digit number (a multiple of 10; 00 to 90) for a Match feature (adjustable). Matching the last two digits of a player score with this number awards a credit. Players exceeding high score levels receive free credits (adjustable) and are able to enter their initials with the new High Score achieved. The game then proceeds into the game-over mode and then to the attract mode. A custom message (adjustable) can be displayed during the attract mode.

MANUAL PERCENTAGING

This game is equipped with Manual Percentage Adjustment.

As previously with our games, you can either set operator adjustments for a replay percent or you can set a fixed replay score.

If you set operator adjustments for a particular replay percent, the game will compute a recommended score to keep the game at that replay percentage. If a change is recommended and the game coin door is opened, the displays will indicate a recommended replay score to beat and make a sound to alert the operator. By pressing the start button, the score to beat will be changed to the recommended level. If you close the coin door or go into audit or adjustment mode, no score change will be made.

You may choose to ignore the recommended change; for example, you may not think last week's players were the usual crowd. Just close the door and the message will disappear without altering the existing level. Or you may choose to make a different score to beat adjustment; this is done by utilizing adjustment AD02.

GAME SPECIFIC FEATURES

Skillshot

From plunger (1) shoot ball into one of three Flashing lanes (2) in Ramp.
(See Display and Back Panel)

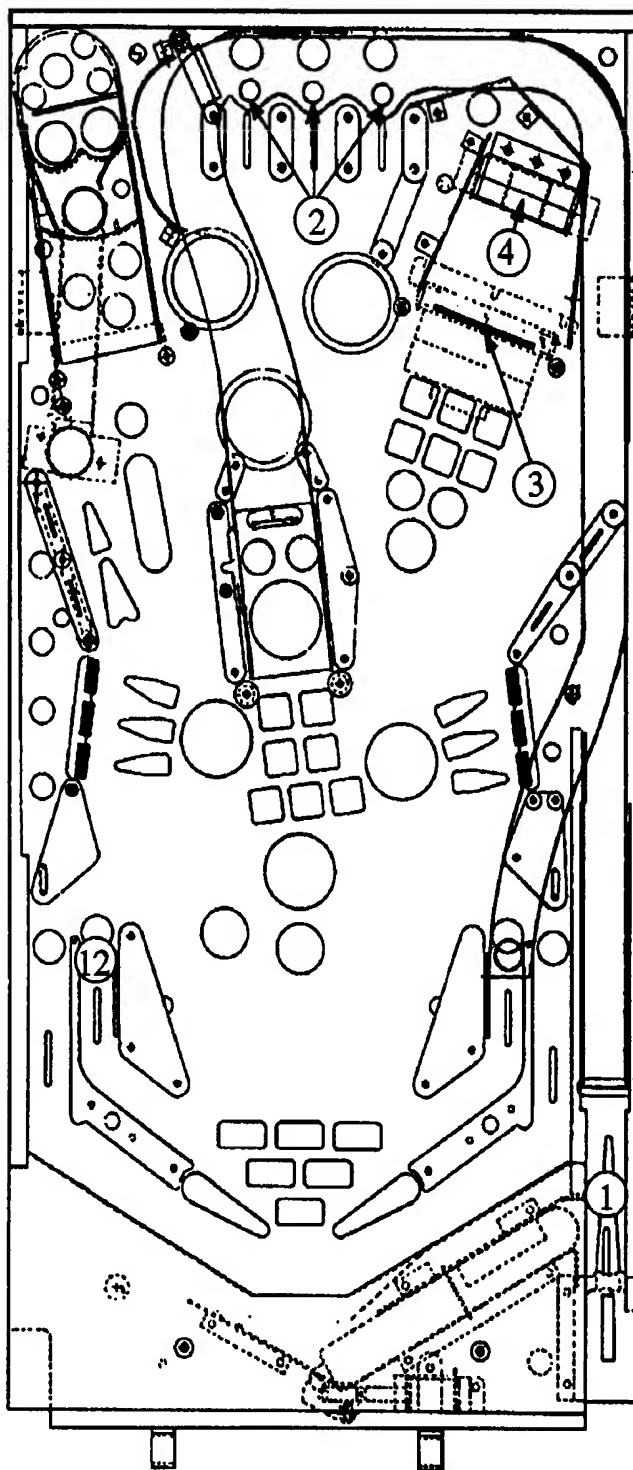
Jackpot & Multiball (2 & 3)

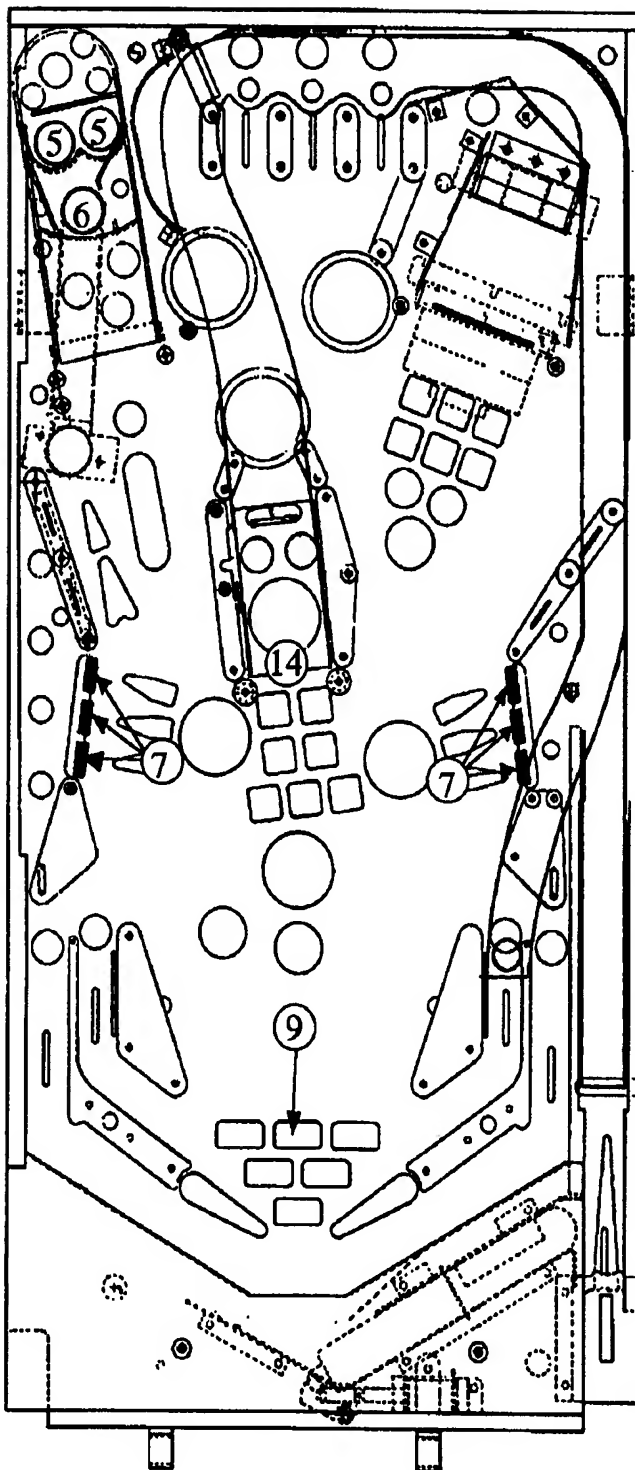
Complete **BATMAN** by shooting the Fugelheim Target (3).
When completed the Target (3) will Drop.

Shoot a ball Into the Museum (4) and a second ball will be automatically into play.-
The ball in the Museum (4) will be shot back Into play (2 Ball).

Shooting both balls Into the Museum will cause a third ball to come into Play. One shot Into the Fugelheim Target (3) will lite the Museum (4) for Jackpot Award.
(See Backglass for Values)

The Left Return Lane (12) to Fugelheim Target (3) Spots two Letters in BATMAN.





Joker Jump

Shooting the Left & Right Eye (5) will lite the Mouth (6) for 4 Million Points or either Eye (5) for 2 Million.

Young Jack & Old Jack Targets

Completing all six targets (7) scores 1,000,000 or 2,000,000 Points.

2,000,000 for completing the last target by striking it with a ball, 1,000,000 by shooting the the unlit Ramp to complete the last Target.
(See Ramp)

Multiplier

Completing the top three rollovers (8) increases the Players Bonus Multiplier.

For Bonus Status see the lights (9) located above the Flippers.

Ramp

When a Ramp Value (13) is Lit, Shoot ramp (14) to collect the Lit Value.

Shooting the unlit Ramp (14) will spot one Old or New Jack Target

Ramp Values

- 1 Million Points
- 100K Super Turbos - The player is awarded 100K per hit on any of three Turbo Bumpers (15).
- Lite Extra Ball - Extra Ball can be collected in Hole (11)
- Lite Fast Money - The player can collect 50K per switch by shooting any hole (5) or (6) when Fast Money is Lit.
- Instant 2-Ball
- 1 Million Plus - Shoot Ramp (14)
- 1st Shot awards 1 Million, 2nd shot 2 Million etc. until the countdown timer runs out.
- Maximum X Value - The Multiplier (9) will be set to Maximum for the current Ball in Play.

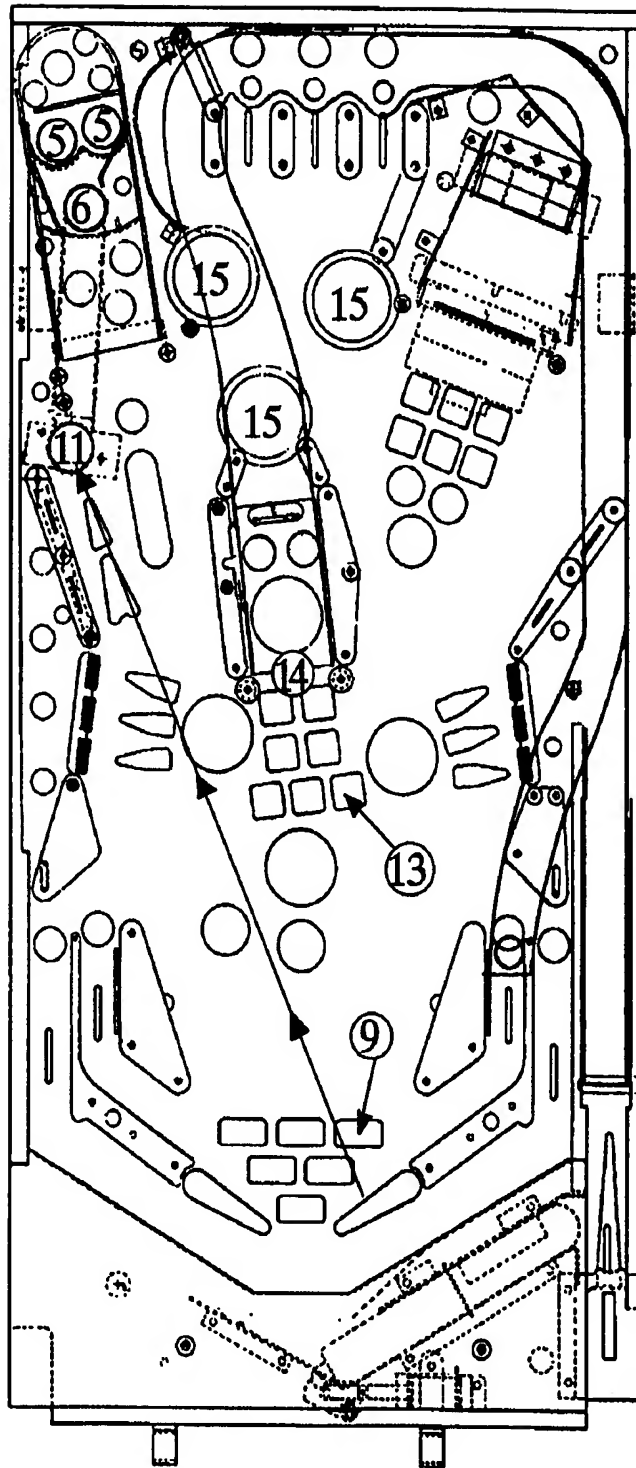
Mystery Hole

Right Return lane (10) to Hole (11) awards a Mystery Value.

Shooting Hole (11) Spots one of seven Ramp Values (13).

Any shot into Hole (11) toggles the Ramp value (13).

Completing the Ramp Shot (14) awards the Lit Value (13).



AUDIT FUNCTIONS

GENERAL

There are 74 audit functions provided for accounting purposes and for evaluation of game difficulty adjustments. Audit functions are split into two groups. There are eight most-used audits (AU01 through AU08) in a 'quick look' group and 65 less-used audits (E AU10 through E AU74), in an 'expanded' group. The various auditing functions are summarized in the **AUDITING FEATURES TABLE** and, when accessed, are shown on the player score displays. The *Audit Number* is shown in the Player 3 Display, the *Description* in the Player 1 and 2 Displays, and the *Audit Total* in the Player 4 Display. Access and control is provided from switches located on the inside of the coin door.

To access audit functions, open the coin door and make sure that the FORWARD/REVERSE switch is in the FORWARD (up) position. Depress the STEP switch and the game name is shown in the Player 1 and 2 displays, the Player 3 display is blank, and the PROM revision level is shown in the Player 4 display. This indicates access to audit functions.

With the FORWARD/REVERSE push-button switch still in the FORWARD (up) position, depressing the STEP push-button switch advances through the audit functions one at a time. To review lower-numbered functions, set the forward/reverse push-button switch to the REVERSE (down) position and operate the STEP push-button switch.

To access expanded audits, operate the step push-button until AU09, EXPAND AUDITS is displayed. Set the choice to ON as indicated in the Player 4 display by depressing the Game Start push-button and then depress the step push-button. The request is installed and E AU10 is displayed. When you exit audits and adjustments, the AU09 setting is returned to off for the next time that a review of audits are required.

Audit totals may be reset to zero using Game Adjustment **Ad11**, Audits Reset. Game adjustments (Ad01 to Ad13 and E Ad14 to E Ad45) begin after the last audit function (AU09 or E AU74). Once audits functions have been recorded, and if no adjustments are required, you may return the game to the attract mode. If adjustments are required, continue pressing the STEP button until the game adjustments are reached. See Game Adjustments for details.

'QUICK LOOK' FUNCTIONS

Total Paid Credits (AU01) - the total number of paid credits is displayed.

Free Percent (AU02) is Free Total (E AU24) divided by Plays Total (E AU25).

Ball Time Average (in seconds) (AU03) is Total Play Time divided by Total Balls Played (AU10).

Average Game Time (AU04) is the Average Game Time expressed in minutes and seconds.

Coins (AU05, 06, and 07) - These three audit totals are provided to show the amount of coins registered for the left, right, and center coin chutes, respectively.

Total Coins (AU08) is the total number of coins dropped through all 3 coin chutes.

Expand Audits (AU09) permits viewing of expanded audits.

Batman Audit Table

Audit Number (Player 3 Display)	Audit Description (Players 1 & 2 Displays: totals in Player 4 Display)	Audit Number (Player 3 Display)	Audit Description (Players 1 & 2 Displays: totals in Player 4 Display)
AU 01	Batman PROM ID	E AU 38	Cycles H.S. Reset
AU 02	Total Paid Credits	E AU 39	Coins No Credit
AU 03	Free Percent	E AU 40	Service Credits
AU 04	Ball Time Average	E AU 41	Total Tickets
AU 05	Game Time Average	E AU 42	Drains Left
AU 06	Coins Left	E AU 43	Drains Center
AU 07	Coins Right	E AU 44	Drains Right
AU 08	Coins Center	E AU 45	Ramp Shots
AU 09	Total Coins	E AU 46	Skill Shots Made
E AU 10	Expand Audits (ON/OFF)	E AU 47	Young Jack Made
E AU 11	Balls Total	E AU 48	Old Jack Made
E AU 12	Extra Balls Total	E AU 49	Spot Jack Target
E AU 13	Extra Ball Percent	E AU 50	2 Ball Multiball
E AU 14	Replay 1 Awards	E AU 51	3 Ball Multiball
E AU 15	Replay 2 Awards	E AU 52	Jackpot Lit
E AU 16	Replay 3 Awards	E AU 53	Jackpot Award
E AU 17	Replay 4 Awards	E AU 54	Million Award
E AU 18	Total Replays	E AU 55	Super Bumps Award
E AU 19	Replay Percent	E AU 56	XBall Award
E AU 20	Total Specials	E AU 57	Fast Money Award
E AU 21	Special Percent	E AU 58	Multiball Award
E AU 22	Total Matches	E AU 59	Loop Award
E AU 23	Hi Score Wins	E AU 60	Mon. 10X Award
E AU 24	High Score Percent	E AU 61	2X Made
E AU 25	Total Free Plays	E AU 62	4X Made
E AU 26	Total Games	E AU 63	6X Made
E AU 27	0.0 - 0.9 Million	E AU 64	8X Made
E AU 28	1.0 - 4.9 Million	E AU 65	10X Made
E AU 29	5.0 - 9.9 Million	E AU 66	More Than 10X Made
E AU 30	10.0 - 19.9 Million	E AU 67	VUK Mystery Scores
E AU 31	20.0 - 29.9 Million	E AU 68	VUK Extra Ball
E AU 32	30 Million Plus	E AU 69	Outlane Special Lit
E AU 33	Average Scores	E AU 70	Outlane Special Award
E AU 34	Games 1Player	E AU 71	Rerace Award
E AU 35	Games 2Player	E AU 72	Bat Cave Special Lit
E AU 36	Games 3Player	E AU 73	Bat Cave Special Award
E AU 37	Games 4Player	E AU 74	# Of Victory Shots
	Attract Minutes		

EXPANDED FUNCTIONS

Balls Total (E AU10) is the total of regular and extra balls.

Extra Balls Total (E AU11) is the total number of extra balls awarded.

Extra Ball Percentage (AU12) is AU11 divided by Plays Total (AU25).

Replay Awards (E AU13 through 16) provide the total awards (credit, extra ball, or audit) for replay levels 1 through 4, respectively.

Total Replays (E AU17) is the total awards (credits, extra balls, or audit only) for exceeding replay score levels.

Replay Percentage (E AU18) is the Replay Total awards for exceeding replay score levels (E AU17) divided by Plays Total (E AU25).

Total Specials (E AU19) is the total awards (credits, extra balls, or scores) for making specials.

Special Percentage (E AU20) is Special Total (E AU19) divided by Plays total (E AU25).

Match Total (E AU21) is the total credits awarded for matching the last two digits of the score with the system-generated Match Number at the end of the game. Percentage of match credits will be adjustable from 0% to 10%, by E Ad 14 if enabled.

High Score Wins (E AU22) is the total credits awarded for exceeding the high-score-to-date scores.

High Score Percentage (E AU23) is High Score Wins (E AU22) divided by Plays Total (E AU25).

Total Free Plays (E AU24) is the total free credits for replays, high-score-to-date, specials, and match.

Total Games (E AU25) is the sum of Total Paid Credits (AU01) and Free Total (E AU24). Note that free credits are not recorded in the audits until they are actually used.

0.0 - 0.9 Million (E AU26) provides the total number of games the Player's final score was between 0 and 999,990 points.

1.0 - 4.9 Million (E AU27) provides the total number of games the Player's final score was between 1,000,000 and 4,999,990 points.

5.0 - 9.9 Million (E AU28) provides the total number of games the Player's final score was between 5,000,000 and 9,999,990 points.

10.0 - 19.9 Million (E AU29) provides the total number of games the Player's final score was between 10,000,000 and 19,999,990 points.

20.0 - 29.9 Million (E AU30) provides the total number of games the Player's final score was between 20,000,000 and 29,999,990 points.

30 Million Plus (E AU31) provides the total number of games the Player's final score was over 30,000,000 points.

Average Scores (E AU32) provides the Average Score by adding the Final Score of each game to a table and dividing this sum by the Total Plays .

Games - Player (E AU33 through 36) provide Individual totals of 1- player, 2-player, 3-player, and 4-player games, respectively.

Attract Minutes (E AU37) provides the number of minutes the game is in Attract Mode (Factory use).

Cycles High Score Reset (E AU38) provides the number of times that the high score levels have been automatically reset (if enabled).

Coin No Credit (E AU39) provides the number of times the coin switch was closed without awarding credit(s)-This option is used in multiple coin conditions.(ie. 2 quarters 1 Play)

Service Credits (E AU40) provides the total number of Service credits added to the game. See *Game Diagnostics* on page 19 for instructions regarding entry of Service Credits.

Total Tickets (E AU41) provides the total number of tickets dispensed.

Drains Left (E AU42) provides the number of times the ball drained out the left drain.

Drains Center (E AU43) provides the number of times the ball drained out the center drain.

Drains Right (E AU44) provides the number of times the ball drained out the right drain.

GAME SPECIFIC FUNCTIONS

Ramp Shots (E AU45) provides the total number of times the Ramp was completed.

Skill Shot Made (E AU46) provides the total number of times the Skill Shot Feature was accomplished.(Note- the feature is enabled at the start of each new ball.)

Young Jack Made (E AU47) provides the total number of times the Right Standup Targets were completed.

Old Jack Made (E AU48) provides the total number of times the Left Standup Targets were completed.

Spot Jack Target (E AU49) provides the total number of times, one of the Jack Targets were Spotted by the Ramp Shot.

2 Ball Multiball (E AU50) provides the total number of times 2 Ball Multiball was achieved.

3 Ball Multiball (E AU51) provides the total number of times 3 Ball Multiball was achieved.

Jackpot Lit (E AU52) provides the total number of times the Jackpot feature was active during Multiball.

Jackpot Award (E AU53) provides the total number of times the Jackpot Feature awarded one of the lit values on the Backglass.

Million Awards (E AU54) provides the total number of times the Million Feature was awarded by completing the Ramp Shot when lit.

Super Bumps Award (E AU55) provides the total number of times the Super Bumps Feature was enabled by completing the Ramp Shot when lit.

XBall Award (E AU56) provides the total number of times the Extra Ball was enabled by completing the Ramp Shot when lit and then collected by shooting the Left VUK.

Fast Money Award(E AU57) provides the total number of times the Fast Money Feature was enabled by completing the Ramp Shot when lit and then collected by shooting the Joker's Face.

Multiball Award (E AU58) provides the total number of times the Multiball Feature was enabled by completing the Ramp Shot when lit.

Loop Award (E AU59) provides the total number of times the Looping Feature was enabled by completing the Ramp Shot when lit.

Mon. 10X Award (E AU60) provides the total number of times the 10X Bonus Feature was enabled by completing the Ramp Shot when lit.

2X (E AU61) provides the number of times 2X bonus was enabled.

4X (E AU62) provides the number of times 4X bonus was enabled.

6X (E AU63) provides the number of times 6X bonus was enabled.

8X (E AU64) provides the number of times 8X bonus was enabled.

10X (E AU65) provides the number of times 10X bonus was enabled.

More Than 10X Made (E AU66) provides the number of times, completing the Top 3 Lanes after 10X is enabled 500,000 points would be awarded.

VUK Mystery Score (E AU67) provides the number of times the Left VUK Mystery Score was awarded.

VUK Extra Ball (E AU68) provides the number of times the Left VUK Extra Ball was awarded.

Outlane Special Lit(E AU69) provides the total number of times the Outlane Special was lit by completing the shot from the right flipper return lane to the Left VUK during the 2nd or 3rd ball.

Outlane Special Made(E AU70) provides the total number of times the Lit Outlane awarded a Special.

Rerace Award (E AU71) provides the total number of times the Multiball Feature was re-enabled by the program. (Note- In the early stages of Multiball, a safety timer is used to re-establish the feature, should a ball exit prematurely.)

Bat Cave Special Lit ((E AU72) provides the total number of times the Bat Cave Special was lit. (Note- The Bat Cave lites at random during the last ball of the game.)

Bat Cave Special Made ((E AU73) provides the total number of times the Bat Cave Special was awarded for completing the lit Ramp shot.

of Victory Shots (E AU74) provides the number of times the game awarded 3 Million points, by completing the Ramp during Victory Mode.

GAME ADJUSTMENTS

GENERAL

There are 45 adjustable functions provided to vary difficulty of play and to periodically reset audits and the high score levels. The various game adjustments are summarized in the **Game Adjustments Table** and, when accessed, are shown on the player score displays. The *Adjustment Number* is shown in the Player 3 Display, the *Description* in the Player 1 and 2 Displays, and the setting in the Player 4 Display. Access and control is provided from switches located on the inside of the coin door.

Game adjustments are accessed from the audit mode. With the audits displaying game identification and the FORWARD/REVERSE switch in the REVERSE (down) position, depress the STEP switch and E Ad45 (Expanded Adjustment 45) is shown in the Player 3 display, FACTORY RESTORE is shown in the Player 1 & 2 displays, and OFF is shown in the Player 4 display. With the audits displaying AU09 (or expanded E AU74) and the FORWARD/REVERSE switch in the FORWARD (up) position, depress the STEP switch and Ad01 is shown in the Player 3 display, REPLAY MANUAL/FIXED is shown in the Player 1 and 2 displays, and the setting is shown in the Player 4 display.

With the FORWARD/REVERSE switch in the FORWARD (up) position, depressing the STEP switch advances through the game adjustments one at a time. With it in the REVERSE (down) position, the STEP switch selects lower-numbered adjustments. To rapidly scroll through adjustments, hold the STEP switch depressed. Adjustment values are changed by operating the GAME START push-button. The FORWARD/REVERSE switch setting determines whether the values are increased or decreased. (With the FORWARD/REVERSE switch up, the value increases, with it down, the value decreases). When the STEP switch is depressed the Player 1 and 2 displays indicate REQUEST INSTALLED.

REPLAY AND GENERIC FEATURES

Replays may be adjusted either for fixed levels or for a system-adjusted manual percentage of replay awards. Four levels may be selected. Adjustments allow awarding of a credit or an extra ball as each level is exceeded. With the manual percentage feature, if the actual replay percentage is higher or lower than that desired, the game computes new recommended manual percentage score(s). When the coin door is subsequently opened the player displays indicate the recommended level and a sound is made to alert the operator of a potential change. This new level is entered into adjustments simply by pressing the game start push-button. (If the coin door is closed or you enter audits/adjustments or diagnostics, the replay level is not changed.)

REPLAYS (Ad 01 through 06)

Ad 01 Replay Manual/Fixed

- **Manual:** Adjust for percentage of awards for replay levels (1% through 50%). Proceed to Ad 02 and 03 for starting replay levels.
- **Fixed:** Lower the automatic value below 1% and Player 1 display indicates FIXED. Proceed to Ad 02 and 03 for fixed replay levels.

Ad 02 Start Replay

- **Manual:** Adjust the starting Replay 1 setting to between 100,000 and 99,900,000.

Ad 03 Levels Replay/Level 1,2,3 & 4 Replay

- Adjust the number of replay levels to be active (1 to 4). Any additional starting replay levels are automatically set to values higher than Replay 1
- Adjust Replay 1 level to between 100,000 and 99,900,000. (Same as Start Replay)
 - If Ad 03 is set for 2, adjust Replay 2 level to between 100,000 and 99,900,000.
 - If Ad 03 is set for 3, adjust Replay 3 level to between 100,000 and 99,900,000.
 - If Ad 03 is set for 4, adjust Replay 4 level to between 100,000 and 99,900,000.

BATMAN

Game Adjustment Table

Adjustment Number (Player 3)	Description (Players 1 & 2)	Factory Setting (Player 4)
Ad 01	Replay/Manual	10%
Ad 02	Start Replay	20,000,000
Ad 03	Levels Replay *	01
Ad 04	Game Awards	CREDIT
Ad 05	Limit Freegame	03
Ad 06	Limit Extraball	03
Ad 07	Game Rules	FACTORY
Ad 08	Game Price*	USA2
Ad 09	Game Cleaned	NO
Ad 10	Coin Reset	NO
Ad 11	Audits Reset	NO
Ad 12	Restore H.S.T.D.	NO
Ad 13	Expand Adjustments	NO
E Ad 14	Match Percent	08
E Ad 15	Balls Per Game	03
E Ad 16	Tilt Warnings	01
E Ad 17	Replay Boost	NO
E Ad 18	Credits Limit	30
E Ad 19	High Scores Allowed	YES
E Ad 20	Hiscore 1 Awards	03
E Ad 21	Hiscore 2 Awards	01
E Ad 22	Hiscore 3 Awards	00
E Ad 23	Hiscore 4 Awards	00
E Ad 24	Backup World Record	30,000,000
E Ad 25	Backup Hiscore 1	25,000,000
E Ad 26	Backup Hiscore 2	20,000,000
E Ad 27	Backup Hiscore 3	18,000,000
E Ad 28	Backup Hiscore 4	16,000,000
E Ad 29	Backup Hiscore 5	14,000,000
E Ad 30	Reset H.S.T.D. Every	700
E Ad 31	Clean Game Every	1500
E Ad 32	Free Play	NO
E Ad 33	Custom Mesage	ON
E Ad 34	Attract Mode Music	ON
E Ad 35	Flash Lamps	NORMAL
E Ad 36	Coils Pulse	NORMAL
E Ad 37	Level Adjust By	ANY
E Ad 38	Install Country	USA
E Ad 39	Ticket Dispenser	OFF
E Ad 40	# Tickets Per Award	1
E Ad 41	Outlane Toggle	BOTH
E Ad 42	Joker Timer	FACTORY
E Ad 43	Winners Circle	OFF
E Ad 44	Million Plus Loop Timer	FACTORY
E Ad 45	Factory Restore	OFF

* Some settlngs result in Drop-Down Tables- See Text

Ad 04 Game Awards Set for replays to award: **CREDIT, EXTRA BALL, NONE** or **SPECIAL** (when score threshold is achieved a playfield special is lit).

Ad 05 Limit FreeGame - Adjust for the maximum number of free games that may be accumulated per game; 0 to 9 .

Ad 06 Limit Extra Balls - Adjust for the maximum number of extra balls that may be accumulated per game; 1 to 9 or OFF.

SINGLE-FUNCTION DIFFICULTY ADJUSTMENT (Ad 07)

Any one of five INSTALL settings for this adjustment may be activated to automatically select settings for multiple adjustments affecting game difficulty .Use the Start button to choose the difficulty level you require and press the step button to activate the setting. After activation, the individual adjustments may be readjusted if desired. Refer to Install Adjustment Table for details.

Ad 07 Game Rules - Set to **EXTRA EASY, EASY, FACTORY, HARD** or **EXTRA HARD**.

Install Adjustment	E Ad07 Extra Easy	E Ad07 Easy	E Ad07 Factory	E Ad07 Hard	E Ad07 Extra Hard
E Ad 41 Outlane Toggle	FLIPPER	BOTH	BOTH	SLING	SLING
E Ad 42 Joker Timer	EXEASY	EASY	FACTORY	HARD	EXHARD
E Ad 44 Million Plus Loop Timer	EXEASY	EASY	FACTORY	HARD	EXHARD

NOVELTY / 5-BALL/ADD-A-BALL SETTINGS

The following three combinations are recommended for situations where local laws restrict certain game features regarding the use of replays or the number of balls per game:

Novelty Play Rules - Set to establish recommended settings for no free play or extra balls:

Ad 01 Manual Replay = Fixed
Ad 02 Start Replay = 00
Ad 03 Levels Replay = None
Ad 04 Game Awards = None
Ad 05 Limit Freegame = 0

Ad 06 Limit Extra Balls = 0
E Ad 14 Match Percent = Off
E Ad 20 World Record Awards = 0
E Ad 21-23 Todays 1-3 Awards = 0

5-Ball Play Rules - Set to establish recommended settings for 5-ball play:

Ad 01 Manual Replay = 07%
Ad 02 Replay Start = 30,000,000
Ad 03 Replay Levels = 01
Ad 04 Game Awards = Credit
Ad 05 Limit Freegame = 3
Ad 06 Limit Extra Balls = 3
E Ad 14 Match Percent = 04

E Ad 15 Balls/Game = 5
E Ad 20 World Record Awards = 3
E Ad 21 Todays 1 Award = 1
E Ad 41 Outlane Toggle = Slings
E Ad 42 Joker Timer = Factory
E Ad 43 Winners Circle = Off
E Ad 44 Million Plus Loop Timer. = Hard

Extra Ball Settings-To disable awarding of credits and provide awards with an extra ball make the following adjustments:

Ad 04 Game Awards = Extra Ball
Ad 05 Limit Freegame = 0
E Ad 14 Match Percent = OFF

E Ad 19 Scores Highest = No
E Ad 20 to 23 World Record & Todays High Awards = 0

GAME PRICING (Ad 08)

There are two methods available for coin switch programming; Standard and Custom. Standard pricing uses a single adjustment (Ad 08) to select a pricing scheme shown in the **Standard /CustomPricing Table**. Custom pricing is used to select additional pricing schemes defined by a Drop Down menu .

With Ad 08 set to **CUSTOM** operating the step button again initiates a drop down menu representing coin switch pulses for the left, right, and center coin slots. The prescribes the number of pulses required for one credit. For example, if *Left Coin Pulses*, was set to 02 and *Coin Switch Pulses Required for 1 Credit*, to 01 a coin in the left slot would produce two credits. Further, if *Left Coin Pulses*, was set to 01 and *Coin Switch Pulses Required for 1 Credit*, to 02, two coins in the left slot would be required for one credit.

Coin Switch Pulses Required for Bonus Credit may be set to post bonus credits when a minimum amount of coins are inserted at one time. For example, if *Left Coin Pulses* was set to 01, *Coin Switch Pulses Required for 1 Credit* to 01 and *Coin Switch Pulses Required for Bonus Credit* to 04, one credit would be posted for each of the first three coins in the left slot and two credits for the fourth coin.

Standard/Custom Pricing - Set for the desired pricing scheme from the Standard Pricing Table as indicated in the Player 1 and 2 displays. For Custom Pricing, set to **CUSTOM**. When set to CUSTOM, the following adjustments are utilized to tailor each individual coin chute.

Left Coin Switch Pulses - Set the number of pulses registered for closure of the left coin switch; 00 to 99.

Right Coin Switch Pulses - Set the number of pulses registered for closure of the right coin switch; 00 to 99.

Center Coin Switch Pulses - Set the number of pulses registered for closure of the center coin switch; 00 to 99.

Coin Switch Pulses Required for 1 Credit - Set the number of coin switch pulses required to post one credit; 00 to 99.

Coin Switch Pulses Required for Bonus Credit- Set the number of coin switch pulses required to award a bonus credit; 00 to 99.

CUSTOM PRICING TABLE

Coin Mechs			Plays/Coins	Adjustments					
Left	Right	Center		Ad08	Left P	Right P	Mid P	Pulse/1Cr	Puls/bon
25¢	25¢	\$1.00	1/25¢ 3/50¢ 1/25¢ 5/\$1.00 1/25¢/ 6/\$1.00	Custom	01	01	04	01	02
				Custom	01	01	04	01	04
				Custom	05	05	20	04	20
5SCH	10SCH	10SCH	1/10 SCH 1/10 SCH 4/30SCH	Custom	01	02	02	02	00
				Custom	04	08	08	06	00
20¢	\$1.00	--	1/20¢ 1/60¢ 2/\$1.00	Custom	01	05	00	01	00
				Custom	01	05	00	03	05
10P	10P	50P	1/10P 6/50P 1/20P 3/50P	Custom	01	01	05	01	05
				Custom	01	01	05	02	05

STANDARD PRICING TABLE

Ad 08 Standard Pricing Select			Coin Mechs			Plays/Coins		
1	2	4	Left	Center	Right	Left	Center	Right
USA1	1COIN	1PLAY	25¢	\$1.00	25¢	1 PLAY/ 1COIN	4 PLAY/ 1COIN	1 PLAY/ 1COIN
USA2	4 COINS	3PLAYS	25¢	\$1.00	25¢	1 PLAY/ 2COIN 2 PLAY/ 3COIN 3 PLAY/ 4COIN	3 PLAY/ 1COIN	1 PLAY/ 2COIN 2 PLAY/ 3COIN 3 PLAY/ 4COIN
USA3	2 COINS	1 PLAY	25¢	\$1.00	25¢	1 PLAY/ 2COIN	2 PLAY/ 1COIN	1 PLAY/ 2COIN
USA4	2COINS	1 PLAY 1COIN BUY-IN	25¢		25¢	2 COINS FOR THE 1st PLAY 1PLAY/ 1 COIN ONLY DURING BUY-IN		
AUSTRIA COINAGE			5 SCH	10 SCH	10SCH	1 PLAY/ 2COIN 2 PLAY/ 3COIN 3 PLAY/ 4COIN	1 PLAY/ 1COIN 3 PLAY/ 2COIN	1 PLAY/ 1COIN 3 PLAY/ 2COIN
AUSTRALIA COINAGE			20¢	\$1.00	\$2.00	1 PLAY/ 3COIN	2 PLAY/ 1 COIN	4 PLAY/ 1COIN
UK COINAGE			10P	50P	£1	1 PLAY/ 3COIN	2 PLAY/ 1COIN	5 PLAY/ 1COIN
SWISS 1 SWISS 2			1 SFR	2 SFR	5 SFR	Same as German 1 Same as German 2		
BELGIUM COINAGE			20f	50f	20f	1 PLAY/ 1COIN	3 PLAY/ 1COIN	1 PLAY/ 1COIN
GERMAN 5DM 1		7 PLAYS	1DM	2DM	5DM	1 PLAY/ 1COIN	2 PLAY/ 1COIN	7 PLAY/ 1COIN
GERMAN 5DM 2		9 PLAYS	1DM	2DM	5DM	1 PLAY/ 1COIN 3 PLAY/ 2COIN 5 PLAY/ 3COIN 7 PLAY/ 4COIN 9 PLAY/ 5COIN	3 PLAY/ 1COIN 7 PLAY/ 2COIN 10 PLAY/ 3COIN 14 PLAY/ 4COIN	9 PLAY/ 1COIN
NETHERLAND COINAGE			1 Guilder	1 Guilder	2.5Guilder	1 PLAY/ 1COIN	1 PLAY/ 1COIN	3 PLAY/ 1COIN
SWEDEN COINAGE			1KR	5KR	5KR	1 PLAY/ 3COIN 2 PLAY/ 5COIN	2 PLAY/ 1COIN	2 PLAY/ 1COIN
FRANCE 1 COINAGE			1f	5f	10f	1 PLAY/ 3COIN 2 PLAY/ 5COIN 1 PLAY/ 5COIN	2 PLAY/ 1COIN	5 PLAY/ 1COIN
FRANCE 2 COINAGE			1f	5f	10f	1 PLAY/ 5COIN	1 PLAY/ 1COIN	3 PLAY/ 1COIN
ITALY COINAGE			500L		500L	1 PLAY/ 1COIN		1 PLAY/ 1COIN
SPAIN COINAGE			25P		100P	1 PLAY/ 1COIN		5 PLAY/ 1COIN
JAPAN COINAGE					100¥			1 PLAY/ 1COIN 3 PLAY/ 2COIN

ADDITIONAL GENERIC FEATURES

Ad 09 Game Cleaned - When enabled (set to **YES**) the game cleaning counter will be reset to zero and Game Clean-Me Green light will go out when STEP is depressed. (Also see E Ad31.)

Ad 10 Coin Reset - When enabled (set to **YES**) all coin and paid credit totals will be reset to zero when STEP is depressed.

Ad 11 Audits Reset - When enabled (set to **YES**) all audit totals except for coins and paid credits will be reset to zero when STEP is depressed.

Ad 12 Restore High Score - When enabled (set to **YES**) the High Score Levels and associated initials will be restored to backup settings when STEP is depressed .

Ad 13 Expand Adjustments - When set to **NO**, depressing the STEP push-button advances directly to E Ad 45, FACTORY RESTORE. When set to **YES**, depressing the STEP push-button sequences through the expanded adjustments. When exiting from expanded adjustments, this function is reset to **OFF** for the next time that adjustments are required.

E Ad 14 Match Percent- Set Match percent from **00%** to **10%** or **OFF**. At 00% the match display occurs at the end of the game but never awards a credit.

E Ad 15 Balls Per Game - Adjust the number of balls per game; **2** to **5**.

E Ad 16 Tilt Warnings - Adjust the number of plumb bob tilt switch closures before the ball in play is tilted; **1** to **3** or **OFF**.

E Ad 17 Replay Boost - Set to **YES** or **NO**. When set to **YES**, exceeding a replay will set a temporary replay level for each time a replay level is surpassed. This new level will equal the player's final score (when the replay was awarded) for each following game, until the replays have all been played. At this time the previous level is resumed.

E Ad 18 Credits Limit - Adjust the maximum number of credits that may be posted; **4** to **50**.

HIGH SCORE LEVELS (E Ad 19 through 30)

There are four of the six high score levels with associated player initials that are displayed during the attract mode. This provides a high-score-to-date feature. When players exceed these levels, the player initials may be entered to replace the previous ones. These levels may be adjusted to award credits and to be reset to backup values after a selected number of games.

E Ad 19 Hiscores Allowed - Set to enable or disable the four high score levels; **YES** or **NO**.

E Ad 20 World Record - Adjust the number of credits awarded for exceeding level 1 (the highest of the four levels); **0** to **5**.

E Ad 21 Highscore 1 Award- Adjust the number of credits awarded for exceeding level 1; **0** to **3**.

E Ad 22 Highscore 2 Award - Adjust the number of credits awarded for exceeding level 2; **0** to **2**.

E Ad 23 Highscore 3 Award - Adjust the number of credits awarded for exceeding level 3; **0** to **1**.

E Ad 24 Backup World Record - Adjust the score level to which the world record (the highest of the four levels) may be altered. This adjustment is not affected by E Ad30 (Factory Reset defaults to 7,500,000).

E Ad 25 Backup Highscore 1 - Adjust the backup score level to which level 1 may be reset.

E Ad 26 Backup Highscore 2- Adjust the backup score level to which level 2 may be reset.

E Ad 27 Backup Highscore 3- Adjust the backup score level to which level 3 may be reset.

E Ad 28 Backup Highscore 4- Adjust the backup score level to which level 4 may be reset.

E Ad 29 Backup Highscore 5- Adjust the backup score level to which level 5 may be reset.

E Ad 30 High Score Reset Every - Adjust the number of games between automatic resets of high score levels to backup settings and ball time averager adjustments; 100 to 900 or OFF (no reset or adjustment).

E Ad 31 Clean Game Every- Adjust the number of games in which the Clean Game message appears in Tech Alert to indicate the playfield needs cleaning. Adjustable from 100 to 2000.

E Ad 32 Free Play - When set to **YES**, no coins are required for games.

E Ad 33 Custom Message - When desired, this function is used to establish a custom message periodically displayed during the attract mode. Set the feature to **CHANGE** using the Credit button and depress **STEP**. The letter **A** is indicated in the first position of the Player 1 display. Vary the letter by operating the left and right flippers. With the desired letter indicated, depress the **CREDIT** button to lock in the letter and advance to the next display character. Repeat this procedure until the desired message is indicated in the Player 1 and 2 displays. At this time, depress the **STEP** push-button switch to advance to E Ad 34.

E Ad 34 Attract Mode Music - Set to **ON** (approximately every 3 minutes), or **OFF**.

E Ad 35 Flash Lamps- Set to **NORMAL**, **DIM** or **OFF**. When set to **NORMAL** the Flash Lamps are active, when **DIM** the Flash Lamps impulse power is reduced by 25% and when **OFF** the Flash Lamps do not flash.

E Ad 36 Coils Pulse- Set To **NORMAL**, **HARD** or **SOFT**. When **HARD** the coil pulse power is increased by 12.5% of the normal pulse rate. When set to **SOFT** the coil pulse power is reduced by 12.5% of the normal pulse rate. These adjustments are provided to compensate for Low Line or High Line voltage conditions where the solenoids appear to kicking too weak or too hard.

E Ad 37 Level Adjust by - When set to **OPERATOR**, the Manual Percentage Replay Adjustment can only be altered with the front door open (see manual page 3). When set to **ANY**, the Manual Percentage Replay Adjustment will display the message "PRESS START TO CHANGE REPLAY LEVEL" on power up if a change is recommended, and anyone operating the replay button will initiate the change to the replay score.

E Ad 38 Install Country- Set to **USA**, **FRENCH** or **GERMAN**. Determines the default settings for the respective country for game pricing etc.

E Ad 45 Factory Restore-Depressing **STEP** without changing the value shown in the Player 4 Display locks in any custom message set with E Ad33 and returns the game to GameOver. Set the value to **ON** and depress **STEP** switch to revert all game adjustments to factory settings, clear the Custom Message and return to Game Over.

GAME SPECIFIC FEATURES (E Ad 39 TO E Ad 45)

E Ad 39 Ticket dispenser- Set to **ON** or **OFF**. When set to **ON**, the game will dispense ticket(s) (optional) when each replay award levels is attained. When set to **OFF**, no tickets will be dispensed.

E Ad 40 # Tickets per Award- Set from 1 thru 5. The game will dispense the selected number of tickets for each award level.

E Ad 41 Outlane Toggle- Set to **FLIPPER**, **SLING** or **BOTH**. This feature controls how the lit Outlane Special will alternate from the left lane to the right. When set to **FLIPPER** operating either flipper button will cause the Special light to move from one lane to the other. When set to **SLING** operating either Slingshot switch will cause the Special light to move from one lane to the other. When set to **BOTH** operating either the Flipper or Slingshot switches will cause the Special light to move from one lane to the other.

E Ad 42 Joker Timer- Set to **EXEASY, EASY, FACTORY, HARD** or **EXHARD**. Determines how long the Joker feature remains enabled in seconds.

EXEASY	EASY	FACTORY	HARD	EXHARD
18 Seconds	16 Seconds	14 Seconds	12 Seconds	10 Seconds

E Ad 43 Winners Circle- Set to **YES** or **NO**. When set to **YES**, at the end of the game, in a multiplayer game, the higher scoring player will be highlighted on the display and receive an additional 20 seconds of unlimited balls. (This will allow the player to build up his score and attempt to gain replays etc.) When set to **NO** the game will end normally.

E Ad 44 Million Plus Loop Timer- Set to **EXEASY, EASY, FACTORY, HARD** or **EXHARD**. Determines how long the Millions Plus Loop feature remains enabled in seconds.

EXEASY	EASY	FACTORY	HARD	EXHARD
24 Seconds	22 Seconds	20 Seconds	18 Seconds	16 Seconds

GAME DIAGNOSTICS

The Data East Pinball system provides tests for sounds, digital displays, lamps, switches, and solenoids. Each feature may be tested manually or automatically using the STEP and FORWARD/REVERSE push-button switches inside the coin door and the Game Start push-button switch on the front of the cabinet. The automatic tests may be used for a quick verification of automatic test functions and the manual tests, for troubleshooting.

During game play, activation of switches and operation of coils with associated switches are monitored. If a switch is not made for 50 games it is considered bad. When operation of a coil should close or open a switch and does not, the coil is considered bad. In Game over attract mode, bad switches and coils (if any) are reported (See Tech Alert Description below). Note that reporting of an unused switch does not constitute a problem and that a bad coil could mean that the associated switch requires adjustment.

Wiring to switches, solenoids and controlled lamps uses color-coded wires that basically follows a resistor color-code scheme for the eight rows and eight columns. During the switch tests and during the discrete lamp test, identification of the color of the row and column wires are indicated in the Player 3 & 4 Displays. For example, making the right coin switch during the Switch Test results in the switch functional name (RIGHT COIN) shown in the Player 1 and 2 Displays, the row (WHT-YEL) and column (GRN-BRN) wire color codes shown in the Player 3 display, and the switch number shown in the Player 4 display.

BLK = Black
BRN = Brown
RED = Red
ORN = Orange
YEL = Yellow

GRN = Green
BLU = Blue
VIO = Violet
GRY = Grey
WHT = White

ENTERING DIAGNOSTICS

With the game in the game-over mode, open the coin door and make sure that the FORWARD/REVERSE push-button switch is set to REVERSE (down) and depress the STEP push-button switch. The Player displays will show the tollfree Customer Service number 1-800-KICKERS, that is 1-800-542-5377 (U.S. including Illinois) and the toll number (708) 345-7700 (Outside the United States). this indicates entry into game diagnostics.

Service Credits

With the phone number displayed depress the STEP push-button switch. The game now gives the technician the option of adding 1 to 5 service credits. These credits allow the technician to test-play the game without adding any counts to the coin audits (AU 01 & AU 05-AU 08). When the message appears, press and hold the Game Start pushbutton until the desired number of credits are shown on the display. Then press the step button again to add these credits to the game and enter Tech Alert. If no Service Credits are desired, press the step button with the initial message displayed.

Tech Alert

The player displays will now indicate if there are any Bad Switches (Switches that are closed, that should not be or switches that have not been activated in 50 games) It also indicates if the game requires cleaning, based on the number set in E Ad 31.

Burn-In Minutes

Pressing the step button while in Tech Alert mode will step game into Burn-in Mode(Factory use). At this stage pressing the game start button will cause the game to exercise all CPU I/O functions. This is provided to constantly exercise sounds, solenoids, etc...

To stop the test press the start button again. Cumulative Burn-In minutes will be displayed. To reset Burn-In minutes to 00, you must perform a Audit Reset Ad 11 or a Factory Restore E Ad 45.

SOUND TESTS

The Data East Pinball sound system produces true digital stereo sound on left and right speakers and mono on a center speaker. During Sound tests, the bottom display shows the sound board circuit under test and the corresponding sounds are selected by operating the left and right flipper buttons to choose the circuit to be tested. Now press the start button to initiate the sound. Refer to the Sound Test Chart for the sound circuits displayed and the sounds produced.

The sound functions allow verification that all channels are functioning properly and that the speaker connections are correct. Speaker Phase Testing procedures follow for checking speaker connections.

SOUND TEST CHART

Auto/Manual Tests (Player 1 & 2)	Sounds Produced
LEFT SPEAKER CENTER SPEAKER RIGHT SPEAKER VOICE ROM1 (Loc F6) VOICE ROM2 (Loc F4) MUSIC TEST (Sound ROM Loc F7)	Left Sine (Left Speaker Only) Center Sine (All speakers) Right Sine (Right Speaker Only) "Did you ever dance with the devil in the pale moonlight?" " Who are you? " Level 1 Through Level 4 Music

Speaker Phase Testing

Connections to each of the three speakers are polarized and each must be connected appropriately for the best quality sound. If one speaker has the positive and negative connections reversed with respect to the other two, bass frequencies will not be produced properly and the overall sound quality will be poor.

To test for proper speaker phasing, use the sound test to cycle through the Left, Center, and Right Sine functions. If the Center Sine produces more volume and bass than the Left and Right Sines, the speakers are connected properly. If it produces the same or less, one speaker is connected improperly. To isolate and correct reversed speaker connections, one of two methods may be used.

1. Check each speaker for polarity markings. If the speakers have polarity markings, verify that the single-color wire (BLK, YEL or RED) is connected to the negative (-) terminal.
2. Disconnect the speaker output connector from the Sound Board and connect a 1.5-volt battery across each speaker pair one at a time while observing the speakers. Make sure that the positive battery terminal is connected to the positive lead (CN1-pin 1, 3, or 6) each time. As the connection is made, check speaker cone movement; proper connections are indicated by outward movement.

DIGITAL DISPLAY TEST

Digital display utilizes an Intelligent Dot Matrix Display Board. The purpose behind this board is to provide more information to the operator as well as displaying graphics to the player.

The board is controlled by a Z80A microprocessor and it's personality ROM . (Unique to the Game) . It receives Data, Reset & Clock information from the CPU Board via the ribbon cable and sends back Status and Busy signals to the CPU . This is to insure synchronized communication of both boards.

The Drivers for the rows and columns are provided on 3 surface mounted integrated circuits. U13 & U14 supply the anode power to the columns and U15 supplies the cathode power to the rows.

Automatic Test

To enter Display tests, operate the STEP push-button switch from the Sound Manual test. The displays will first illuminate all dots in the entire Display. After a slight delay it will cycle one column from left to right. After a period of time, it will begin the Row test by lighting the top row of the display, then turning it off and illuminating the next row, until each row has been individually lit, while the other rows are off. The next test begins with every other dot lit, in both the rows and columns. These dots then go out, and the unlit dots light, resulting in an alternating checkerboard pattern. The test concludes with the words "DOT MATRIX LIVES". (Please Note- these tests may be interrupted at any time by operating the STEP push-button switch to advance to the next test.

Museum Motor Test

This Game has a feature which lowers a Target Switch (Museum) to allow a shot to the VUK below the playfield. The motor on this mechanism is controlled by a relay driven by Q23 on the CPU and there are 2 Limit switches (Museum motor Up & Museum Motor Down) used by the CPU to determine the status of the Museum Motor.

After entering this test, press and hold the game's Start Button. This will cause the relay to pulse repeatedly as long as the Button is depressed. At the same time you will notice that the switch status (ON & OFF) will be indicated in both the upper and lower portions of the display (Museum motor Up & Museum Motor Down). The appropriate switch should be closed just prior to the limit of the Museum Motor Mechanism and both switches should not be closed (ON) at the same time.

This test is located before the Switch Tests so the technician can move the mechanism until both switches read OFF. This will help eliminate erroneous readings while trying to trace a problem during Active Switch Test.

Switches

Switches are configured in an 8 x 8 matrix of columns (switch drives) and rows (switch returns) with up to 64 switches possible. The switch tests include three parts; switch test, active switches, and bad switches. Row and column wire colors are indicated in each test using corresponding resistor color code numbers.

Switch Test

From the Display Manual test, operate STEP push-button switch. Player 1 and 2 displays indicate SWITCH TEST. Close each switch and observe the displays. The Player 1 and 2 displays will indicate the switch name, the Player 3 display indicates the row and column wire colors, and the Player 4 display indicates the switch number. When a switch is released, the name and number disappear until another switch is closed or the test is exited.

Active Switches

Operate the STEP push-button switch from the Switch Test. Player 1 and 2 Displays indicate ACTIVE SWITCHES. If any switches are stuck closed (or made from the presence of a ball), the Player 1 and 2 displays sequence through switch names, the Player 3 display indicates the row and column wire colors, and the switch numbers are indicated in the Player 4 display. This cycle continues until all switches are cleared or until the STEP push-button switch is depressed.

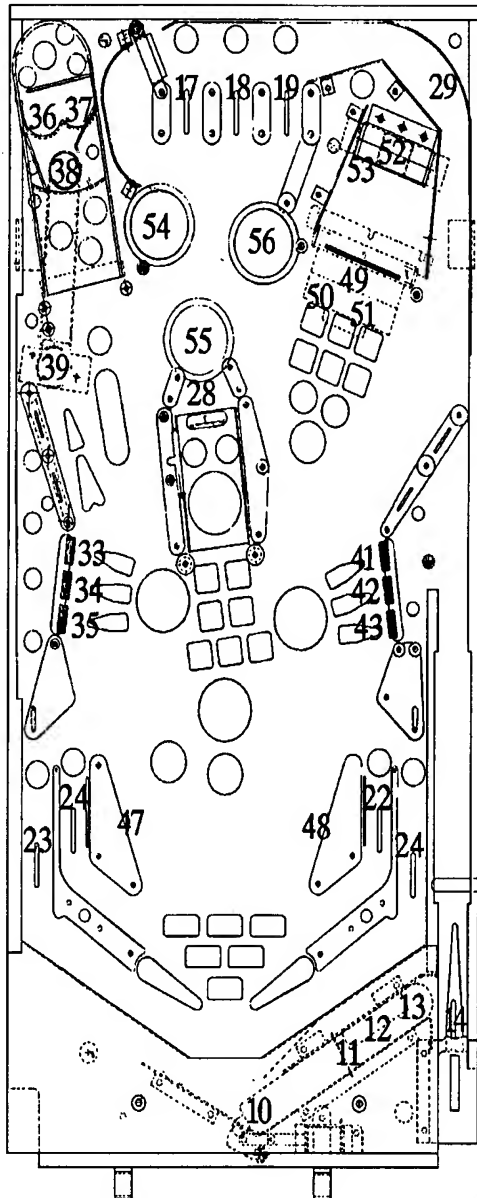
SWITCH MATRIX CHART

COLUMN ROW	1 Q55 GRN-BRN CN8-1	2 Q54 GRN-RED CN8-2	3 Q53 GRN-ORN CN8-3	4 Q52 GRN-YEL CN8-4	5 Q51 GRN-BLK CN8-5	6 Q50 GRN-BLU CN8-7	7 Q49 GRN-VIO CN8-8	8 Q48 GRN-GRY CN8-9
1 WHT-BRN CN10-9	Plumb Tilt 1	Not Used 9	Left Top Lane 17	Not Used 25	Left 3 Bank Top 33	Right 3 Bank Top 41	Bat Bar Standup 49	Not Used 57
2 WHT-RED CN10-8	Not Used 2	Outhole 10	Center Top Lane 18	Not Used 26	Left 3 Bank Middle 34	Right 3 Bank Middle 42	Museum Motor Up 50	Not Used 58
3 WHT-ORN CN10-7	Credit Button 3	Trough #1 Left 11	Right Top Lane 19	Not Used 27	Left 3 Bank Bottom 35	Right 3 Bank Bottom 43	Museum Motor Down 51	Not Used 59
4 WHT-YEL CN10-6	Right Coin 4	Trough #2 Center 12	Not Used 20	Ramp Entrance 28	Joker Left Eye 36	Not Used 44	Right VUK Top 52	Not Used 60
5 WHT-GRN CN10-5	Center Coin 5	Trough #3 Right 13	Left Return 21	Ramp Exit 29	Joker Right Eye 37	Not Used 45	Right VUK Bottom 53	Not Used 61
6 WHT-BLU CN10-3	Left Coin 6	Shooter Lane 14	Right Return 22	Not Used 30	Joker Mouth 38	Not Used 46	Left Turbo Bumper 54	Not Used 62
7 WHT-VIO CN10-2	Slam Tilt 7	Left EOS 15	Left Outlane 23	Not Used 31	Left VUK 39	Left Slingshot 47	Center Turbo Bumper 55	Not Used 63
8 WHT-GRY CN10-1	Not Used 8	Right EOS 16	Right Outlane 24	Not Used 32	Not Used 40	Right Slingshot 48	Right Turbo Bumper 56	Not Used 64

Batman - Switch Part Numbers

Number	Description	Part No.	Number	Description	Part No.
01*	Plumb Tilt	See Cabinet	10	Out Hole	180-5011-00
02	Not Used	-	11	Trough #1 (Left)	180-5009-00
03*	Credit Button	500-5097-02	12	Trough #2 (Center)	180-5009-00
04*	Right Coin	180-5024-00	13	Trough #3 (Right)	180-5010-00
05*	Center Coin	180-5024-00	14	Shooter Lane	500-5303-00
06*	Left Coin	180-5024-00	15*	Left Flip. Cab. Switch	180-5067-00
07*	Slam Tilt	180-5022-00	16*	Right Flip. Cab. Switch	180-5067-00
08	Not Used	-	17	Left Top Lane	515-5138-00
09	Not Used	-	18	Center Top Lane	515-5138-00
			19	Right Top Lane	515-5138-00
			20	Not Used	-
			21	Left Return Lane	515-5138-00
			22	Right Return Lane	500-5142-00
			23	Left Outlane	500-5142-00
			24	Right Outlane	500-5142-00
			25	Not Used	-
			26	Not Used	-
			27	Not Used	-
			28	Ramp Entrance	180-5085-00
			29	Ramp Exit	180-5085-00
			30	Not Used	-
			31	Not Used	-
			32	Not Used	-
			33	Left Bank Top	515-5124-13
			34	Left Bank Middle	515-5124-13
			35	Left Bank Bottom	515-5124-13
			36	Joker Left Eye	180-5010-00
			37	Joker Right Eye	180-5010-00
			38	Joker Mouth	180-5010-00
			39	Left VUK	180-5072-00
			40	Not Used	-
			41	Right 3 Bank Top	515-5124-13
			42	Right 3 Bank Middle	515-5124-13
			43	Right 3 Bank Bottom	515-5124-13
			44	Not Used	-
			45	Not Used	-
			46	Not Used	-
			47	Left Slingshot Sw. (2)	180-5054-00
			48	Right Slingshot Sw. (2)	180-5054-00
			49	Bat Bar StandupTarget	515-5262-00
			50	Museum Motor Up	180-5052-00
			51	Museum Motor Down	180-5052-00
			52	Right VUK Top	180-5072-00
			53	Right VUK Bottom	180-5072-00
			54	Bumper Left	180-5015-00
			55	Bumper Center	180-5015-00
			56	Bumper Right	180-5015-00
			57	Not Used Through 64	

* Indicates Cabinet Switches



Switch Locations

LAMP TESTS

Controlled lamps are configured in an 8 x 8 matrix of columns (lamp drives) and rows (lamp returns) with up to 64 lamps possible. The lamp tests include four parts, all lamps, lamp return (row), lamp drive (column), and discrete (individual) lamps. Row and column wire colors are indicated in the discrete lamp test using corresponding resistor color code numbers.

All Lamps

From the Active Switch test, operate the STEP push-button switch. Player 1 and 2 displays indicate ALL LAMPS and all controlled lamps will light.

Lamp Returns

From the ALL LAMPS test, depress the STEP push-button switch. The top display indicates LAMP RETURNS and the Bottom display Indicates wire color and the LAMP RETURN driver transistor. All controlled lamps in row 1 should be lit. Operating the Game Start push-button switch cycles through each of the rows separately.

Lamp Drives

From the LAMP RETURNS test, depress the STEP push-button switch. The Top display indicates LAMP COLUMNS and the bottom display indicates wire color and the LAMP DRIVES driver transistor. All controlled lamps in column 1 should be lit. Operating the Game Start push-button switch, cycles through each of the columns separately.

Single Lamp

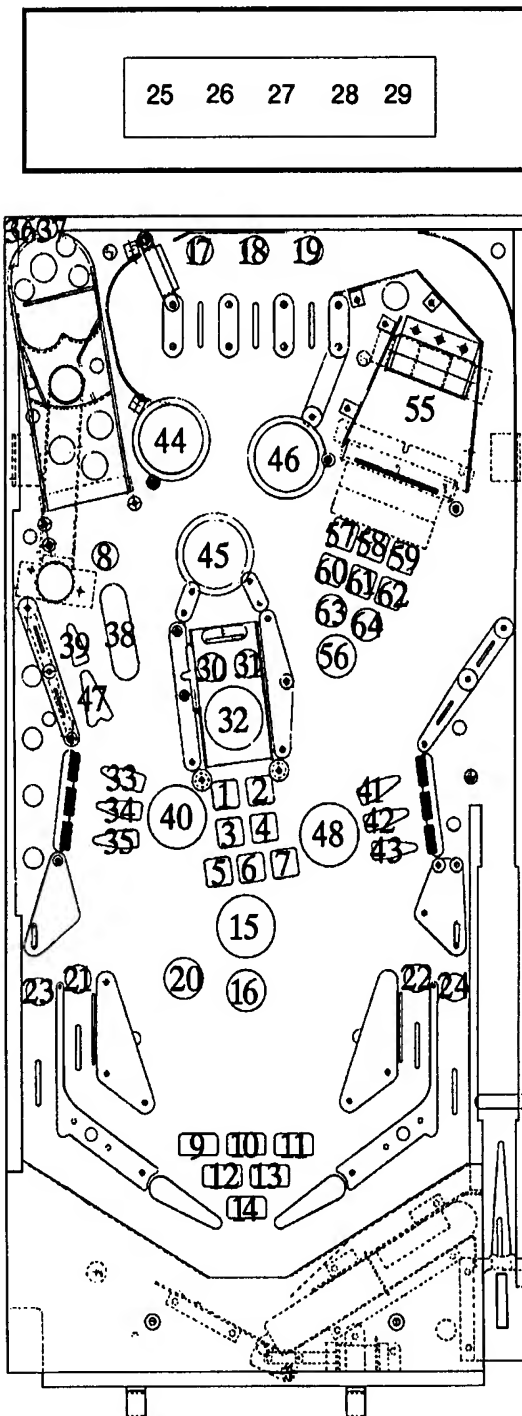
From the LAMP DRIVES test, depress the STEP push-button switch. The top display indicates lamp name. The bottom display indicates the row and column wire colors and the lamp matrix number. Lamp 01 should light. With the FORWARD/REVERSE push-button switch in the FORWARD (up) position, operating the Game Start push-button switch selects higher-numbered lamps; with it in the REVERSE (down) position, Game Start selects lower-numbered lamps.

LAMP MATRIX CHART

ROW \ COLUMN	1 Q71 YEL-BRN CN7-1	2 Q70 YEL-RED CN7-2	3 Q69 YEL-ORN CN7-3	4 Q68 YEL-BLK CN7-4	5 Q67 YEL-GRN CN7-6	6 Q66 YEL-BLU CN7-7	7 Q65 YEL-VIO CN7-8	8 Q64 YEL-GRY CN7-9
1 Q72 RED-BRN CN6-1	1 Million 1	Bottom 2X 9	Left Toplane 17	Backpanel Left 25	Left 3 Bank Top 33	Right 3 Bank Top 41	Ramp Diverter 49	BATMAN 57
2 Q73 RED-BLK CN6-2	Super Bumps 2	Bottom 4X 10	Center Toplane 18	Backpanel Center 26	Left 3 Bank Middle 34	Right 3 Bank Middle 42	Insert-Moon 50	BATMAN 58
3 Q74 RED-ORN CN6-3	Lite Extra Ball 3	Bottom 6X 11	Right Toplane 19	Backpanel Right 27	Left 3 Bank Bottom 35	Right 3 Bank Bottom 43	Insert-5 Million 51	BATMAN 59
4 Q75 RED-YEL CN6-5	Fast Money 4	Bottom 8X 12	Playfield Moon 20	Backpanel 500K 28	Joker Left Eye 36	Left Bumper 44	Insert-15 Million 52	BATMAN 60
5 Q76 RED-GRN CN6-6	Instant 2 Ball 5	Bottom 10X 13	Left Return 21	Backpanel XBall 29	Joker Right Eye 37	Center Bumper 45	Insert-10 Million 53	BATMAN 61
6 Q77 RED-BLU CN6-7	Million Plus 6	Shoot Again 14	Right Return 22	Double Score 30	Joker 2 Million 38	Right Bumper 46	Cab.-Start Button 54	BATMAN 62
7 Q78 RED-VIO CN6-8	Max X Value 7	Batman's Head 15	Left Outlane 23	Under Ramp XBall 31	Left VUK XBall 39	Spot Bat Monitor 47	Museum Bat Symbol 55	Lockball #1 63
8 Q79 RED-GRY CN6-9	Spot Fast Money 8	Batman's Chest 16	Right Outlane 24	3 Million 32	Left 3 Bank Done 40	Right 3 Bank Done 48	Jackpot Lit 56	Lockball #2 64

Lamp Number	Description
01.	1 Million
02.	Super Bumps
03.	Lite Xball
04.	Fast Money
05.	Instant 2 Ball
06.	Million Plus
07.	Max X Value
08.	Spot Fast Money
09.	Bottom 2X

10.	Bottom 4X
11.	Bottom 6X
12.	Bottom 8X
13.	Bottom 10X
14.	Shoot Again
15.	Batman's Head
16.	Batman's Chest
17.	Left Toplane
18.	Center Toplane
19.	Right Toplane
20.	Playfield Moon
21.	Left Return Lane
22.	Right Return Lane
23.	Left Outlane
24.	Right Outlane
25.*	Backpanel Left
26.*	Backpanel Center
27.*	Backpanel Right
28.*	Backpanel 500K
29.*	Backpanel XBall
30.	Double Score
31.	Under Ramp XBall
32.	3 Million
33.	Left 3 Bank Top
34.	Left 3 Bank Middle
35.	Left 3 Bank Bottom
36.	Joker Left Eye
37.	Joker Right Eye
38.	Joker 2 Million
39.	Left VUK Extra Ball
40.	Left 3 Bank Done
41.	Right 3 Bank Top
42.	Right 3 Bank Middle
43.	Right 3 Bank Bottom
44.	Left Bumper
45.	Center Bumper
46.	Right Bumper
47.	Spot Bat Monitor
48.	Right 3 Bank Done
49.	Ramp Diverter
50.*	Insert-Moon (2)
51.*	Insert-5 Million
52.*	Insert-15 Million
53.*	Insert-10 Million
54.	Cab.-Start Button
55.	Museum Bat Symbol
56.	Jackpot Lit
57.	BATMAN
58.	BATMAN
59.	BATMAN
60.	BATMAN
61.	BATMAN
62.	BATMAN
63.	Lock Ball #1
64.	Lock Ball #2



Lamp Locations

* Indicates Insert Panel or Backpanel Lamps

FLASH LAMP COIL TESTS

Twenty-Two regular (pulsed under microprocessor control) coil drivers are provided to switch ground to coils. The Left/Right relay is used in conjunction with drives 1 through 8 to switch +32 volts between coils or flash lamps; these sets are termed "left" and "right". This relay is located on the PPB board which provides isolation diodes and current limiting resistors. This effectively provides 29 regular coils.

Flash Lamp

From the Single Lamp test, depress the STEP push-button switch. All Flash lamps will fire randomly. This allows the Technician to easily spot any burned out bulbs and replace them without stepping through the tests below.

Automatic Test

From the Flash Lamps test, depress the STEP push-button switch. Player 1 and 2 displays indicate ALL COILS. The test pulses each regular solenoid or flash lamp sequentially with the coil/flash lamp name indicated in the Player 1 and 2 displays and the wire colors in the Player 3 and 4 displays.

Select Coil

From the Coil Test, depress the STEP push-button switch. Player 1 and 2 displays indicate SELECT COIL and then the name of 1st drive, the wire colors are indicated in the Player 3 and 4 displays. Operate either Flipper push-button switch to select the coil or flash lamp to be tested. With the desired drive number indicated in the Player 4 display, depress the START push-button switch to cause it to be pulsed repeatedly.

RETURN TO GAME OVER

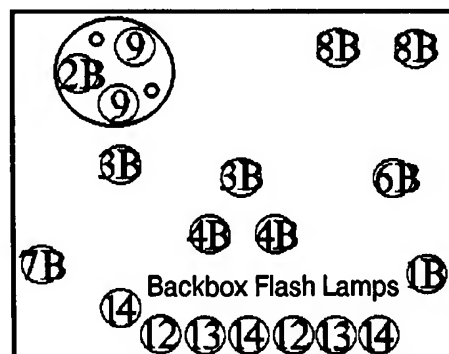
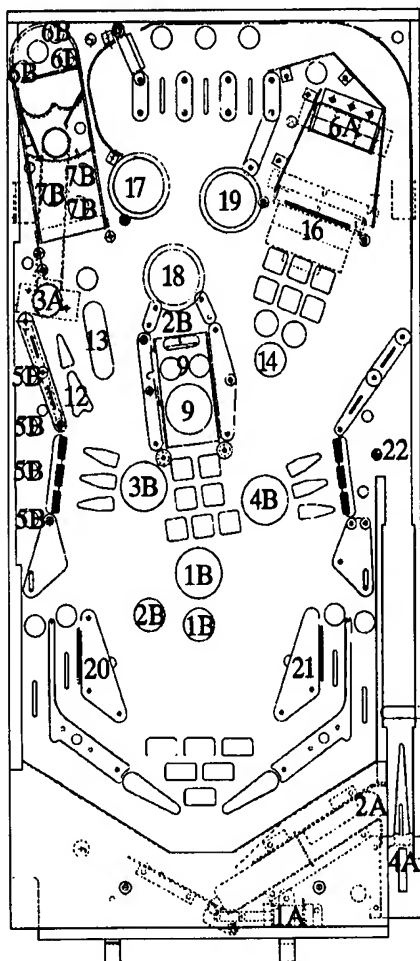
From the Select Coil test, depress the STEP push-button switch once. The game returns to the game-over mode.

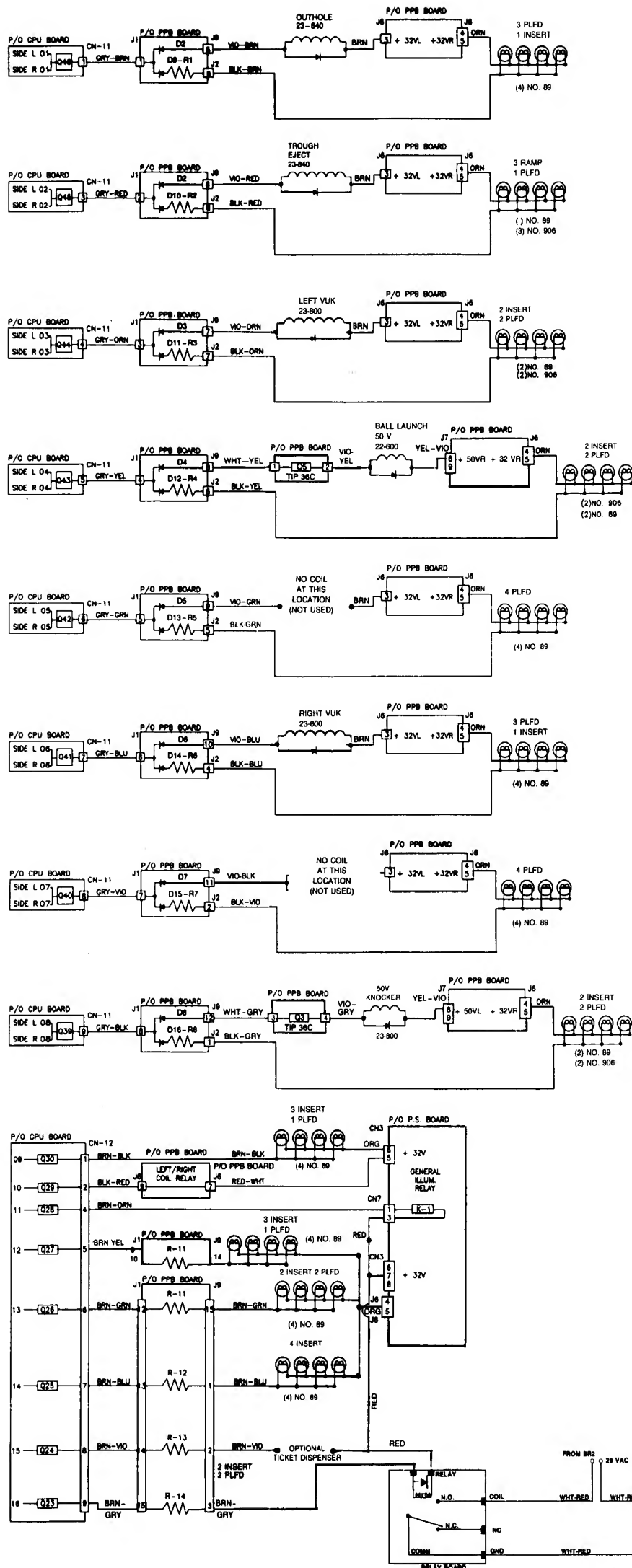
CPU Controlled Auxillary Solenoids

Coil Number	Coil Description	Control Line (CPU to Coil)	Power Line (PS to Coil)	Drive Transistor	Coil Type
17	Left Turbo Bumper	BLU-ORN CPU CN19-3	RED PS CN3-6	Q8	23-800
18	Center Turbo Bumper	BLU-RED CPU CN19-4	RED PS CN3-6	Q9	23-800
19	Right Turbo Bumper	BLU-YEL CPU CN19-6	RED PS CN3-6	Q10	23-800
20	Left Slingshot	BLU-BRN CPU CN19-7	RED PS CN3-6	Q11	23-800
21	Right Slingshot	BLU-GRN CPU CN19-8	RED PS CN3-6	Q12	23-800
22	Motor Circuit (See Schematic)	CPU CN19-9	PS CN3-6	Q13	-

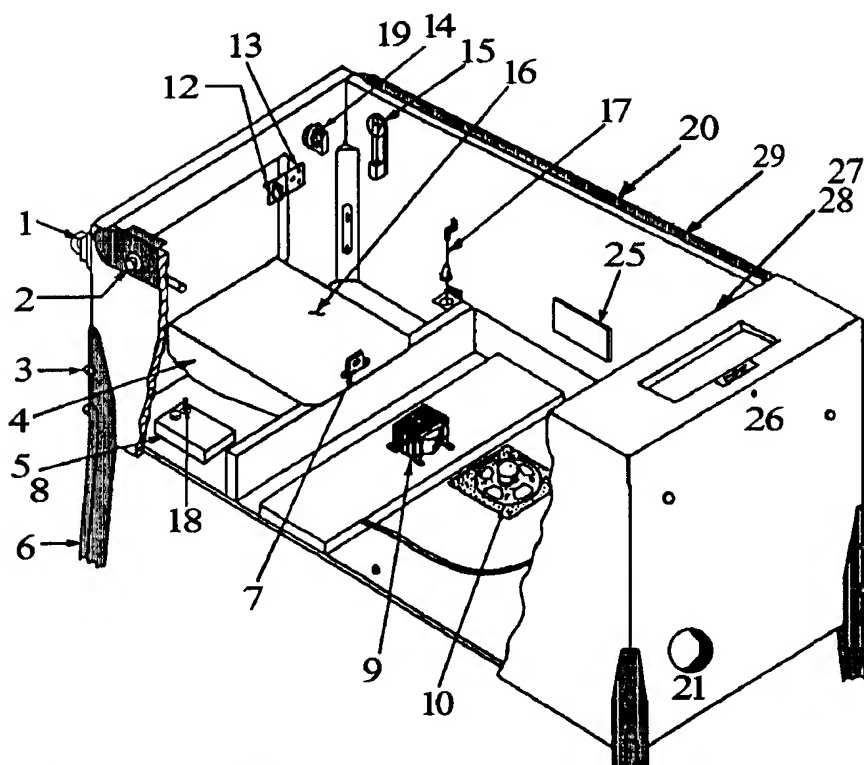
Flipper Solenoids

Coil Description	Flipper GND		Power Lines FlipPc to Coil	Coil Type	Power Input To Flip PCB
	CPU to Coil	Sw. to Flip.PCB			
Left Flipper	ORN-GRY CPU CN19-2	BLU-GRY CN1-9	GRY-YEL CN2-1,2	23-800	BLK-WHT 50VDC
Right Flipper	ORN-VIO CPU CN19-1	BLU-VIO CN1-1	BLK-WHT CN1-1	23-800	GRY, GRY-GRN 8VAC



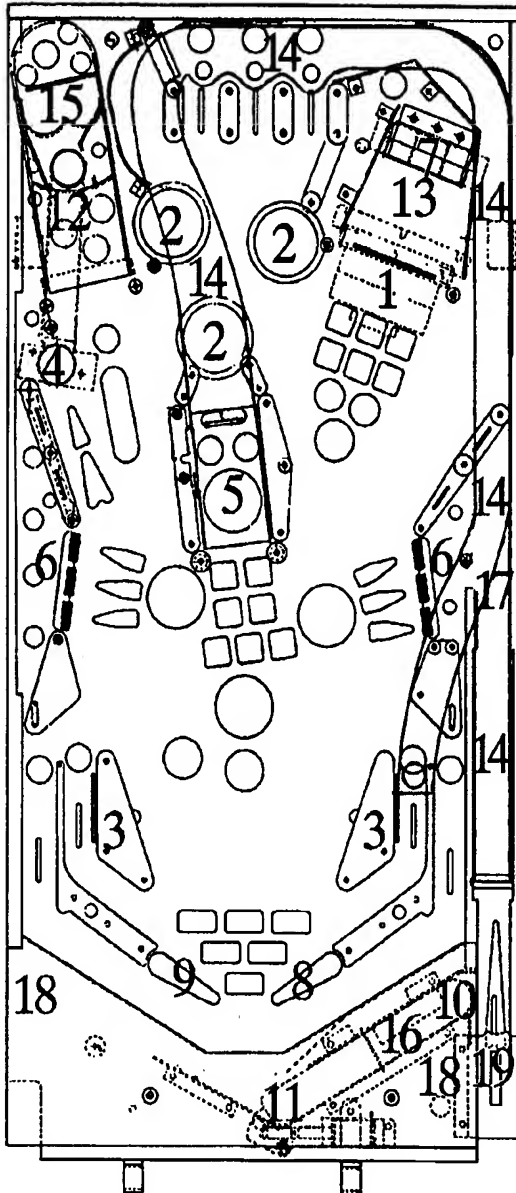


CABINET PARTS ILLUSTRATION



Item	Description	Part No.
1	Ball-Shooter Assy	500-5409-06-04
2	Flipper Button	500-5026-16
3	Leg Bolt (Black)	231-5000-01
4	Cash Box Bottom	545-5090-00
5	On/Off Switch DP/ST	180-5001-00
6	Leg (Black)	535-5020-30
7	Lock Bracket-Cash Box	535-5215-00
8	Power Input Box Assy	515-5360-00-10
9	Transformer	010-5003-00
10	Speaker-Round (6")	031-5000-00
11	Side Armor-Right(Not Shown)	535-5010-31
12	Memory Protect Switch	180-5000-00
13	Memory Protect Switch Bracket	535-5225-01
14	Start Switch Assembly	500-5407-06
15	Flipper Micro Switch	180-5048-01
16	Cash Box Top	535-5013-01
17	Plumb Bob Tilt Assembly	500-5023-00
18	Volume Control	123-5000-00
19	Playfield Glass (Tempered)	660-5001-00
20	Side Armor -Left	535-5010-32
21	Recessed cup for Line cord	545-5122-00
22	Service Switch (Not Shown)	180-5012-00
23	Front Molding Lockdown Assy.	500-5020-00
24	Front Molding -Black (Not Shown)	500-5021-10
25	S.S.Flipper P.C.B.	520-5033-00
26	Roto Lock Bottom	355-5006-01
27	Rear Plastic Extrusion for Playfield Glass	545-5038-00
28	Mounting Foam for Extrusion	626-5004-00
29	Plastic Channel (Right & Left)	545-5017-00

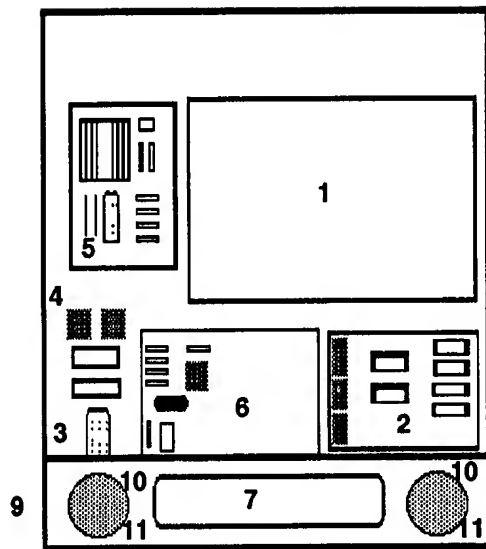
Playfield - Major Assemblies



Item	Description	Part Number
1.	Up Down Target	500-5386-00-11
2.	Pop Bumper	500-5227-00
3.	Sling Shot	500-5226-00
4.	Super VUK	500-5116-04
5.	Bat Cave	545-5281-00
6.	3 Bank Standup Target	500-5384-03
7.	Super VUK	500-5116-03
8.	Flipper Assy Right	500-5177-71
9.	Flipper Assy Left	500-5177-72
10.	Ball Trough eject	500-5012-01
11.	Outhole Kicker	500-5082-00
12.	Joker Chute Assy.	535-5929-00
13.	Up Down Chute Assy.	515-5400-00
14.	Plastic Ramp Assy.	500-5385-00-11
15.	Joker Ramp Assy.	500-5388-00-11
16.	Ball Trough Assy.	500-5044-00
17.	Ball Diverter	535-6116-00
18.	Bottom Arch	545-5170-00
19.	Turbo Kicker	500-5406-00

Individual part breakdowns for most of these assemblies can be found on pages 35 through 41 and 63 & 64.

BACKBOX PARTS ILLUSTRATION



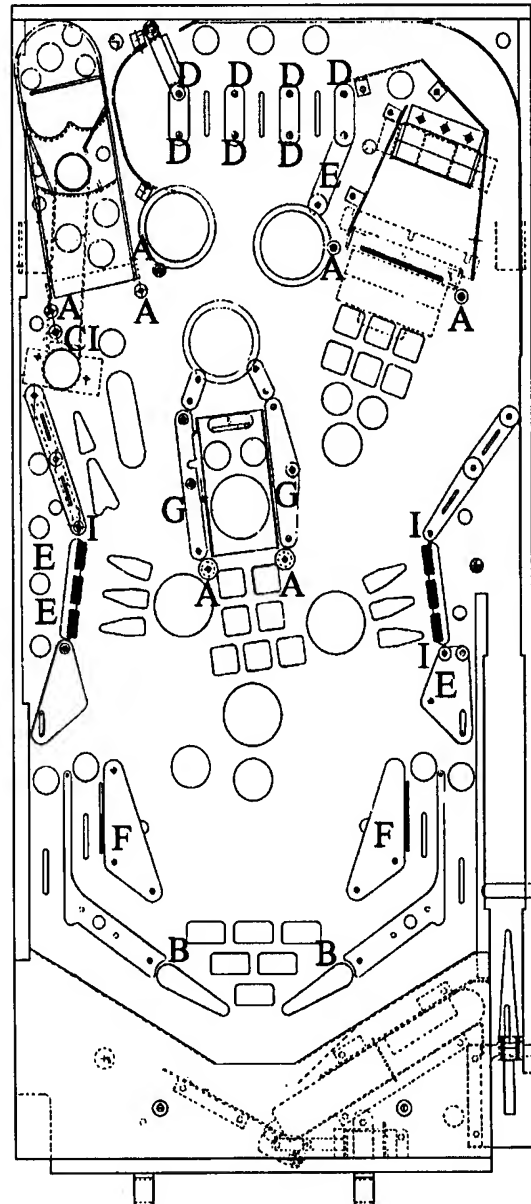
Item	Description	Part No.
1	CPU Board Assy.(Non-Reflex)	520-5003-03 †
2	Sound Board Assy	520-5050-00 †
3	Capacitor 2C1	125-5000-00
4	Bridge Rectifiers	112-5000-00
5	Power Supply Bd. Assy	520-5047-00
6	PPB Board	520-5021-04
7	Dot Matrix Display Bd	520-5042-00 †
8	Display Ribbon Cable*	036-5000-24-10
9	Speaker Housing	500-5416-00-10
10	Speakers (2)	031-5004-00
11	Speaker Grill (2)	830-5604-00
12	Back Box Glass*	830-5211-00
13	Roto-Lock Top*	355-5006-02

* Not Shown

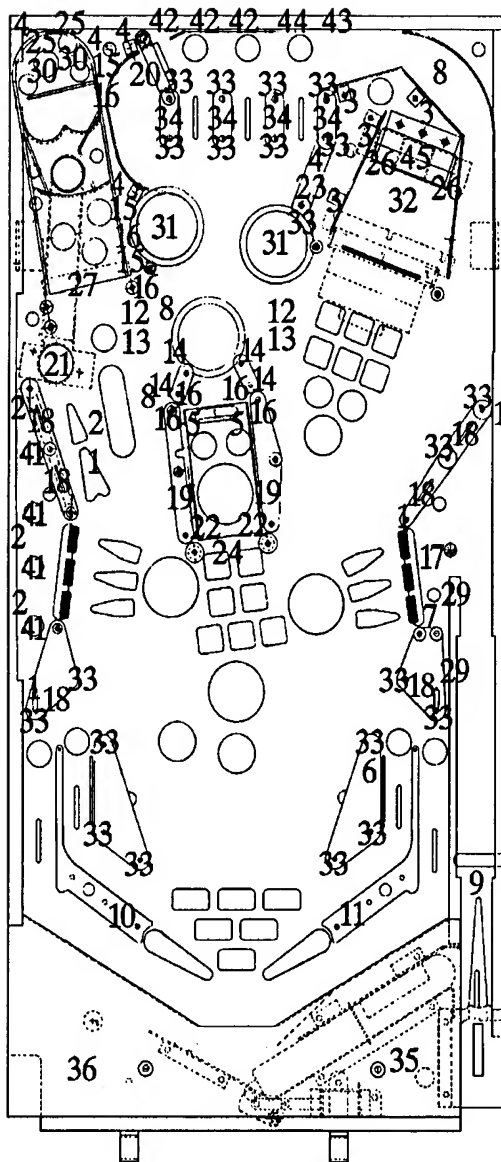
† When ordering PC Boards with ROMs
please specify game name

RUBBER PARTS ILLUSTRATION

Item	Description	Part #
A.	Rubber Post -Long(8)	545-5260-00
B.	Flipper (2)	545-5277-00
C.	$\frac{3}{16}$ "(2)	545-5025-01
D.	$\frac{5}{16}$ "(8)	545-5025-02
E.	1 $\frac{1}{2}$ " (3)	545-5025-07
F.	2 $\frac{1}{2}$ " (2)	545-5025-09
G.	2 $\frac{3}{4}$ " (2)	545-5025-20
H.	Shooter Tip	545-5027-00
I.	Rubber Post -Short (2)	545-5151-00



Playfield Parts



No.	Description	Part Number
1.	#6X1/2 Hex Typ.	234-5001-02
2.	Plastic Spacer (1)	254-5000-02
3.	Plastic Spacer (1)	254-5000-06
4.	Plastic Spacer (1)	254-5000-07
5.	1/2 Hex Spacer	254-5008-03
6.	1 3/4 Plastic Spacer	254-5008-10
7.	Retaining Ring	270-5002-00
8.	Wire Gate and Switch	500-5314-00-11
9.	Batmobile	500-5328-00-11
10.	Lower Left Return	517-0111-07-11
11.	Lower Right Return	517-0111-08-11
12.	Bumper Post Mach	530-5007-00
13.	Post Wood Screw	530-5010-01
14.	Mach Post	530-5012-02
15.	Metal Standoff	530-5035-01
16.	Mach Post Screw	530-5012-02
17.	Diverter Shaft	530-5173-07
18.	Wire Form 1"	535-5300-08
19.	Wire Form	535-5300-12
20.	Rebound Hinge	535-5372-00
21.	Ball Deflector	535-5380-01
22.	Ramp Side Plate	535-5442-00
23.	Wire Form	535-5603-00
24.	Ramp Plate	535-5884-00
25.	Joker Ramp Brkt.	535-5890-00
26.	Museum Brkt.	535-5894-01
27.	Joker Ramp Plate	535-6052-00
28.	Ball Diverter	535-6116-00
*29.	Light Cover Red	545-5014-02
*30.	Light Cover Green	545-5014-04
31.	Bumper Cap	545-5225-03
32.	Flugenheim Museum	545-5280-00
33.	Small Plastic Post	550-5034-03
34.	Light Hood Single	550-5035-03
*35.	Coinage Card	755-5008-02
*36.	Instruction Card	755-5011-00
37.	Decal Sheet	820-5060-XX
*38.	Playfield Mylar	820-5818-00
*39.	Screened Playfield	830-5111-00
*40.	Screened Plastics	830-5415-XX
41.	SB Mini Hat Mars Amber	550-5032-03
42.	SB Mini Mars Amber	550-5031-03
43.	SB Mini Mars	550-5031-07
44.	SB Mini Mars Clear	550-5031-01
45.	Scoop	535-6030-00

Note:
See page 25 for switch part numbers

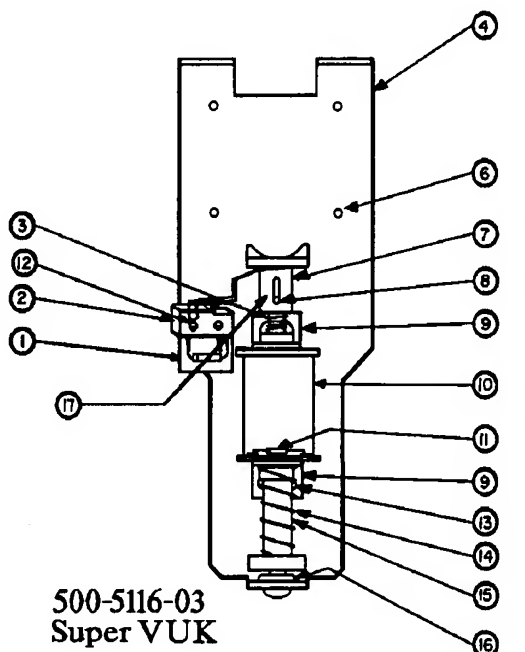
* Indicates not shown

XND3 - COLOR CODE		SPRING COLOR CODE		REV	DESCRIPTION	BY	DATE	APP
01	CLEAR	PART No	WIRE DIA					
02	RED	266-5001-XX						
03	AMBER	-01						
04	GREEN	-02	.042					
05	BLUE	-03	.037					
06	YELLOW	-04	.035					
07	ORANGE	-05	.031					
08	WHITE	-06	.047					
09	PURPLE	-07	.036					
10	FLO. ORANGE	-08	.039					
11	FLO. GREEN	-09	.041					
12	FLO. BLUE							

NOTE
1ST XX - DENOTES ROD ASSY.
2ND XX - DENOTES SPRING

REV	DESCRIPTION	DATE	SCALE	REQ.	MAT.	QTY
1	PLUNGER TIP	505-5276-00				1
2	RETAINING RING	270-5012-00				1
3	WASHER	242-5014-00				2
4	BUSHING	280-5010-00				2
5	ROD ASSY	530-5023-00				1
6	SPRING	266-5010-00				1
7	HOUSING	266-5011-XX				1
8	PLUNGER TIP	505-5276-00				1
9	BUSHING	280-5010-00				1
	TITLE	SHOOTER ASSY				
	SCALE	1" = 1"				
	REQ.	NEXT ASSEMBLY				
	MAT.	DATA EAST PINBALL, INC.				
	QTY	1990 JANICE AVE. MELROSE PARK, IL 60160				

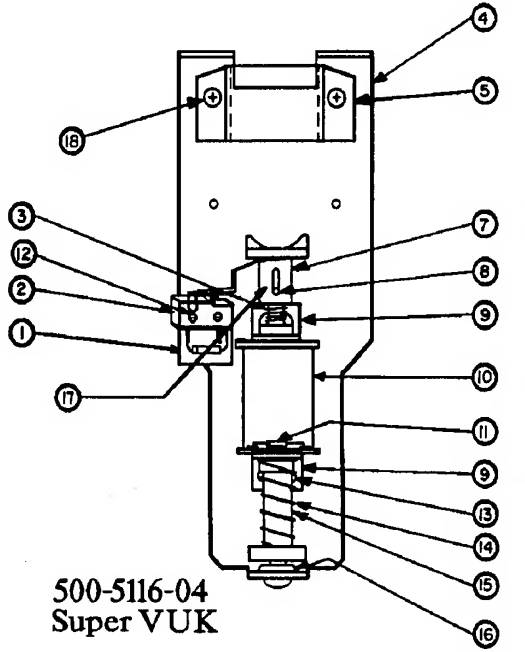
	Item	Part #	Description



Item	Part #	Description
1	545-5193-00	Sw.Insulator
2	180-5064-00	Micro Switch
3	266-5025-00	Cap Spring
4	535-5298-01	Ball Kickup Mtg. Brkt
5		6-32 Tap (4)
6	232-5201-00	#6-32X ³ / ₈ SEMS(2)
7	545-5227-00	Vert.Kick.Cap
8	535-5111-00	Pin ³ / ₃₂ x ⁷ / ₁₆
9	535-5203-01	Coil Retainer Brkt.(2)
10	090-5023-00	Coil 22-600
11	112-5003-00	1N4004 Diode
12	237-5806-00	2-56x ¹ / ₂ Screw(2)
13	232-5200-00	#6-32x ¹ / ₄ Phil.M.S.
14	266-5009-00	Spring
15	515-5352-00	Plunger Assy.
16	280-5003-00	Bumper
17	270-5010-00	Compression Ring(3)

500-5116-03
Super VUK

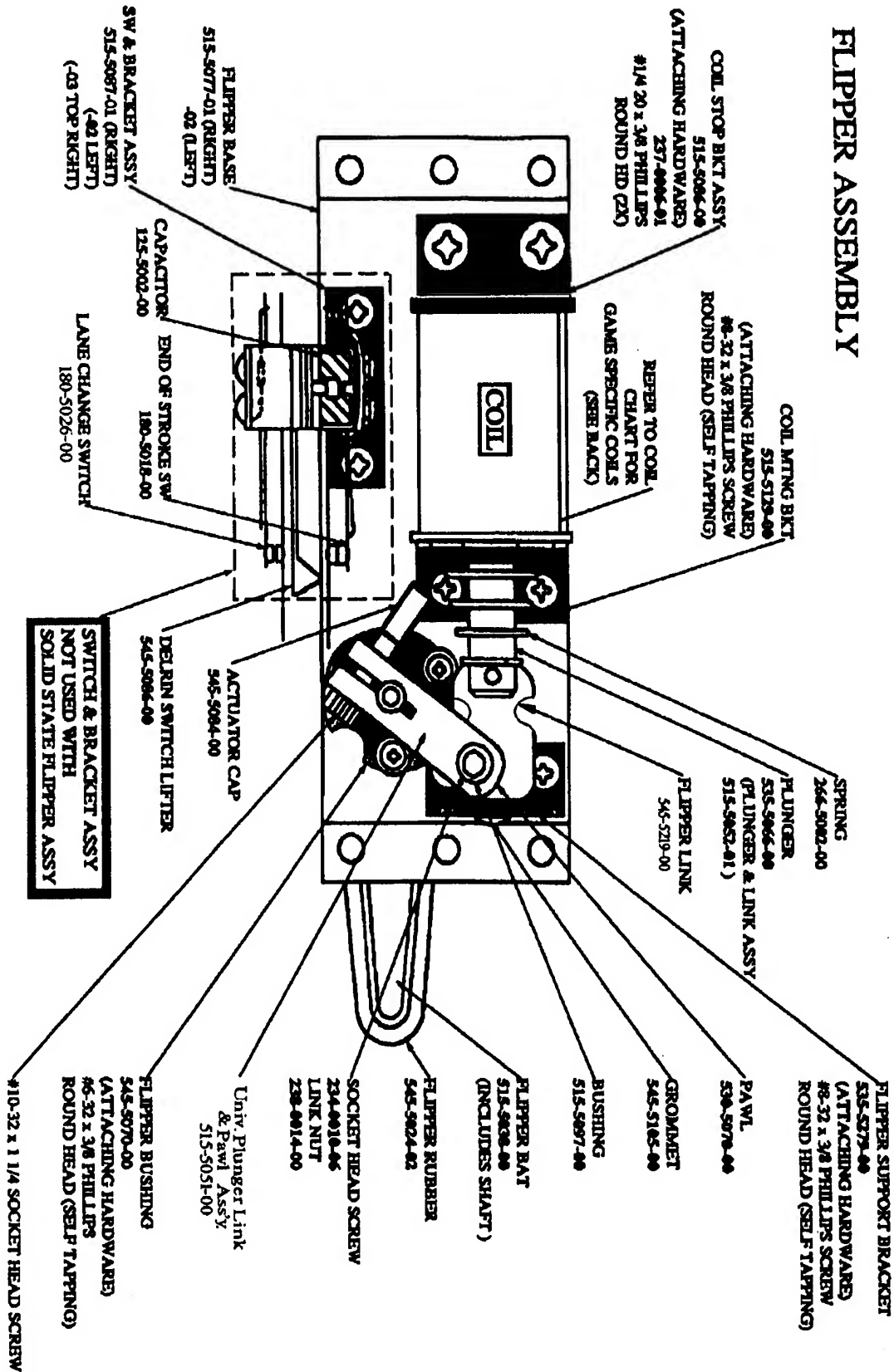
	Item	Part #	Description



Item	Part #	Description
1	545-5193-00	Sw.Insulator
2	180-5064-00	Micro Switch
3	266-5025-00	Cap Spring
4	535-5298-00	Ball Kickup Mtg. Brkt
5	535-6047-00	Ball Guide Brkt
6	232-5201-00	#6-32X ³ / ₈ SEMS(2)
7	545-5227-00	Vert.Kick.Cap
8	535-5111-00	Pin ³ / ₃₂ x ⁷ / ₁₆
9	535-5203-01	Coil Retainer Brkt.(2)
10	090-5001-00	Coil 23-800
11	112-5003-00	1N4004 Diode
12	237-5806-00	2-56x ¹ / ₂ Screw(2)
13	232-5200-00	#6-32x ¹ / ₄ Phil.M.S.
14	266-5009-00	Spring
15	515-5352-00	Plunger Assy.
16	280-5003-00	Bumper
17	270-5010-00	Compression Ring(3)
18	232-5200-00	#6-32 X ¹ / ₄ SEMS

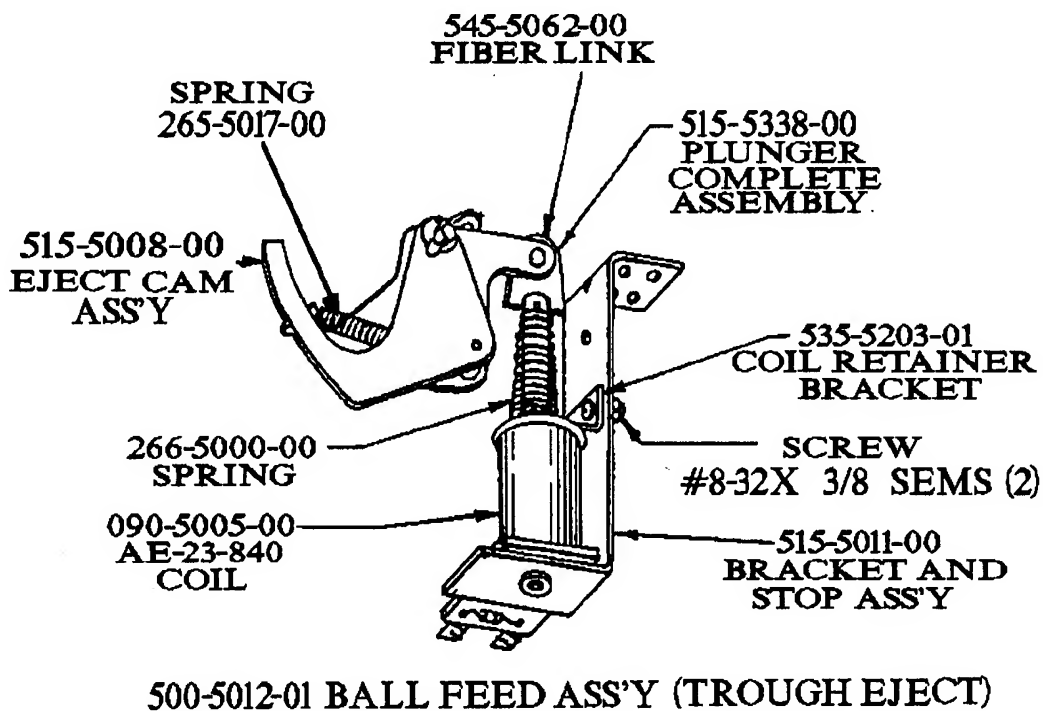
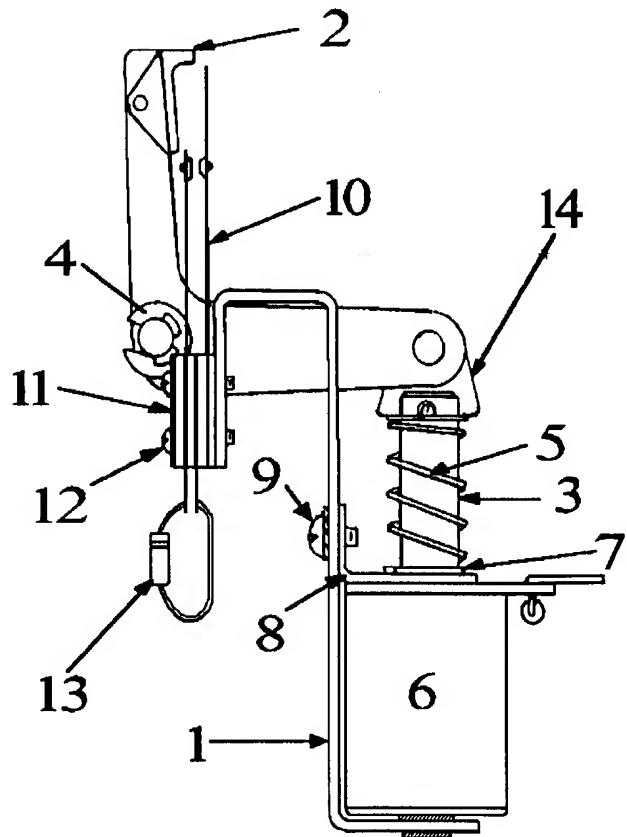
500-5116-04
Super VUK

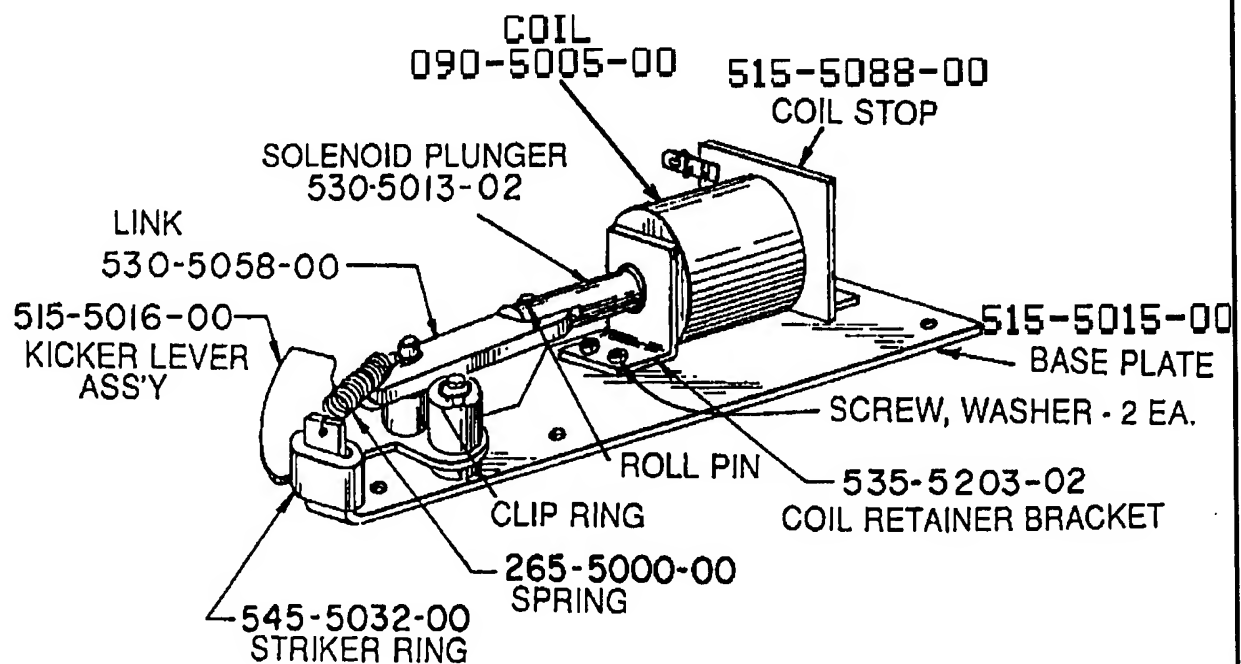
FLIPPER ASSEMBLY



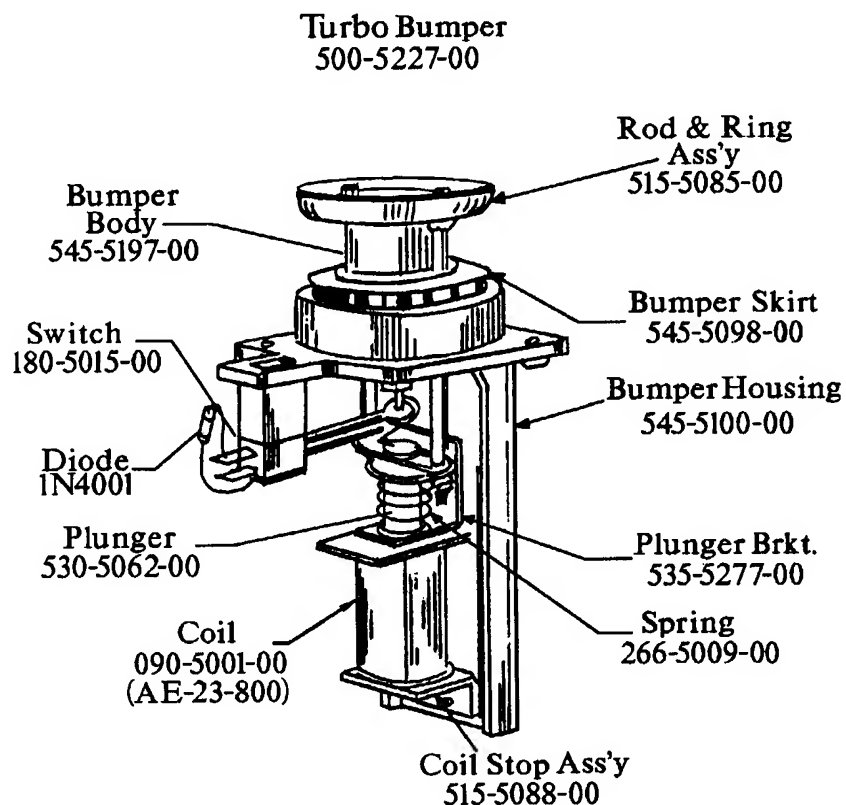
Slingshot Assembly 500-5226-00

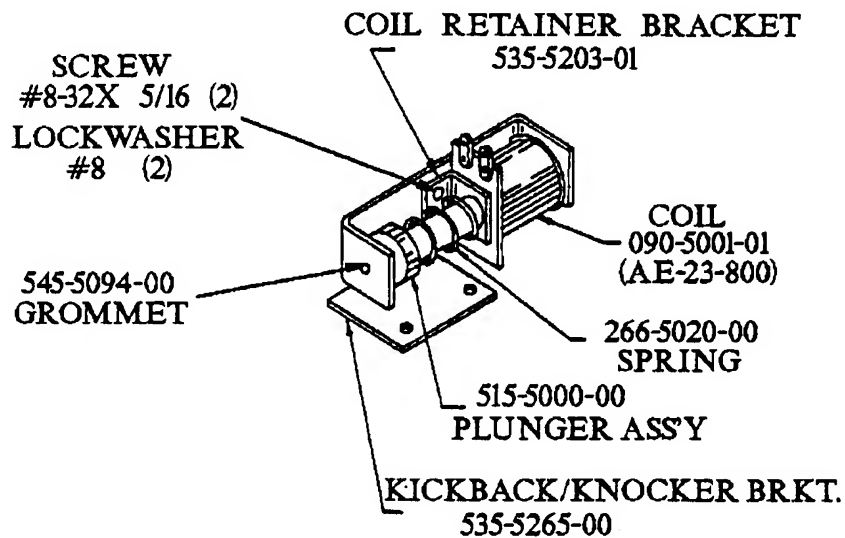
Item	Description	Part No.
1	Slingshot Bracket	515-5339-00
2	S.S. Arm & Tip Assy.	515-5340-00
3	Plunger & Link Assy.	515-5338-00
4	1/4 Retaining Ring (2)	270-5002-00
5	Spring	266-5020-00
6	23-800 Coil	090-5001-02
7	Coil Sleeve	260-0004-00
8	Coil Retainer	535-5203-01
9	#8-32 X 1/4" Screw (2)	232-5300-00
10	Slingshot Switch (2)	180-5054-00
11	Tension Plate (2)	535-5846-00
12	#4-40 X 1/2" Screw (4)	237-5837-00
13	Diode 1N4004 (2)	112-5004-00
14	Link, Plunger	545-5062-00



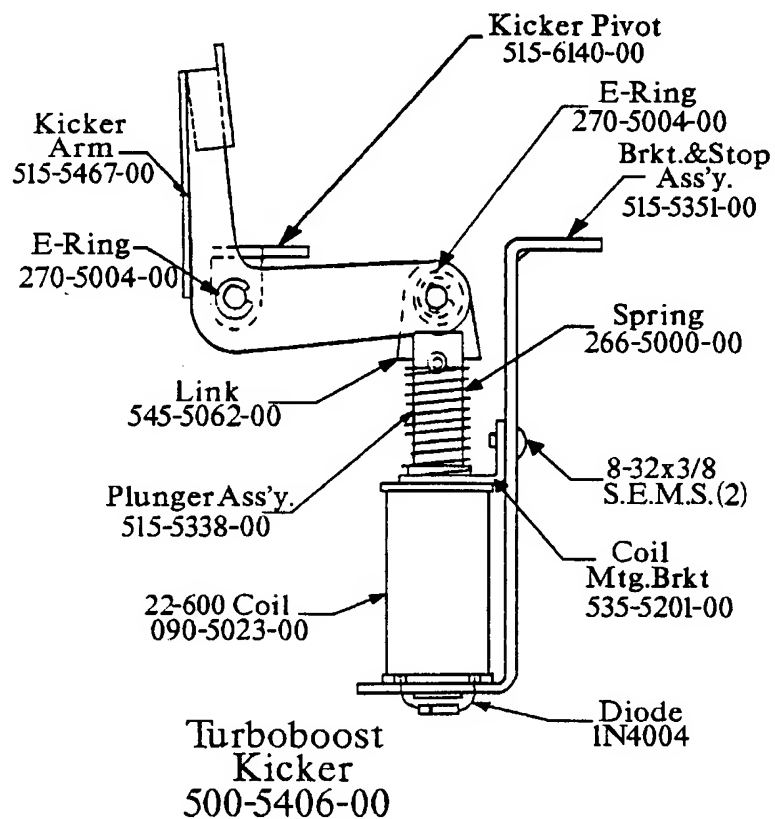


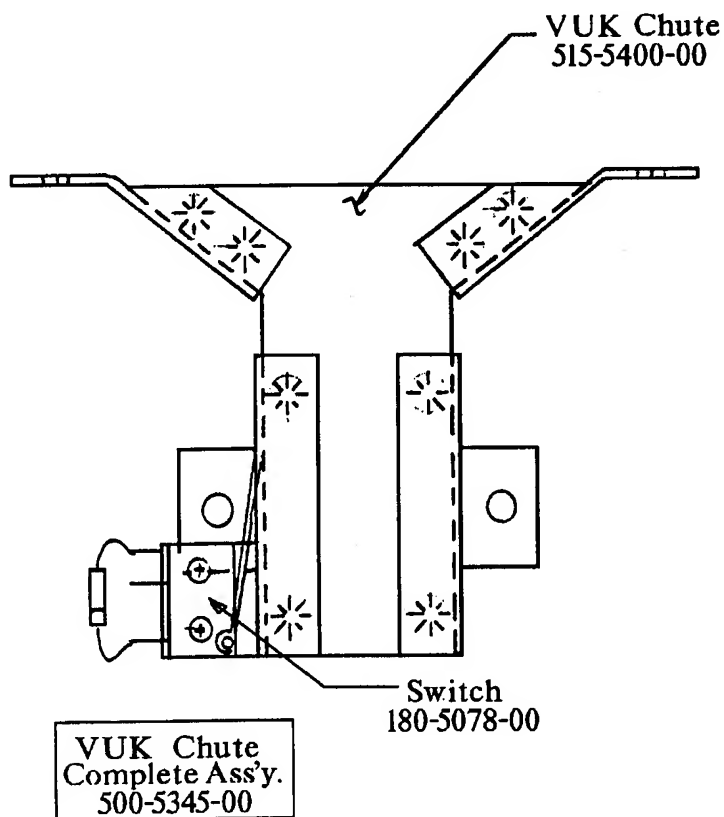
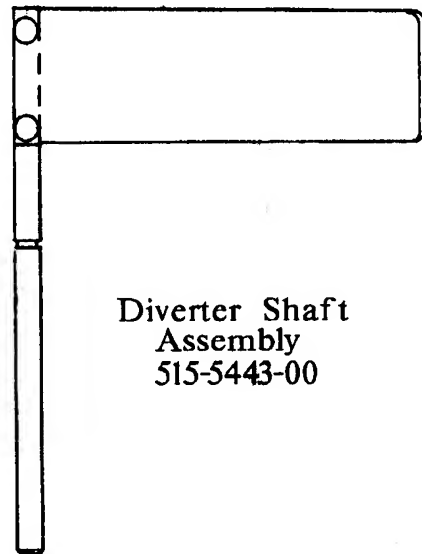
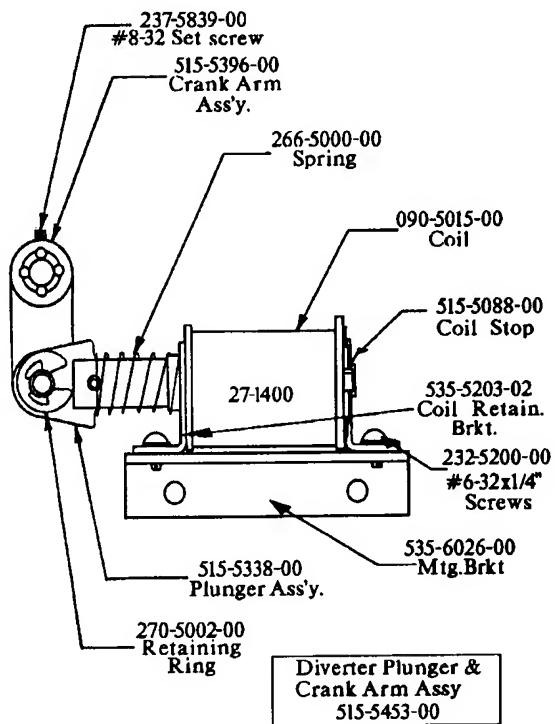
500-5082-00 OUTHOLE BALL RETURN ASSY

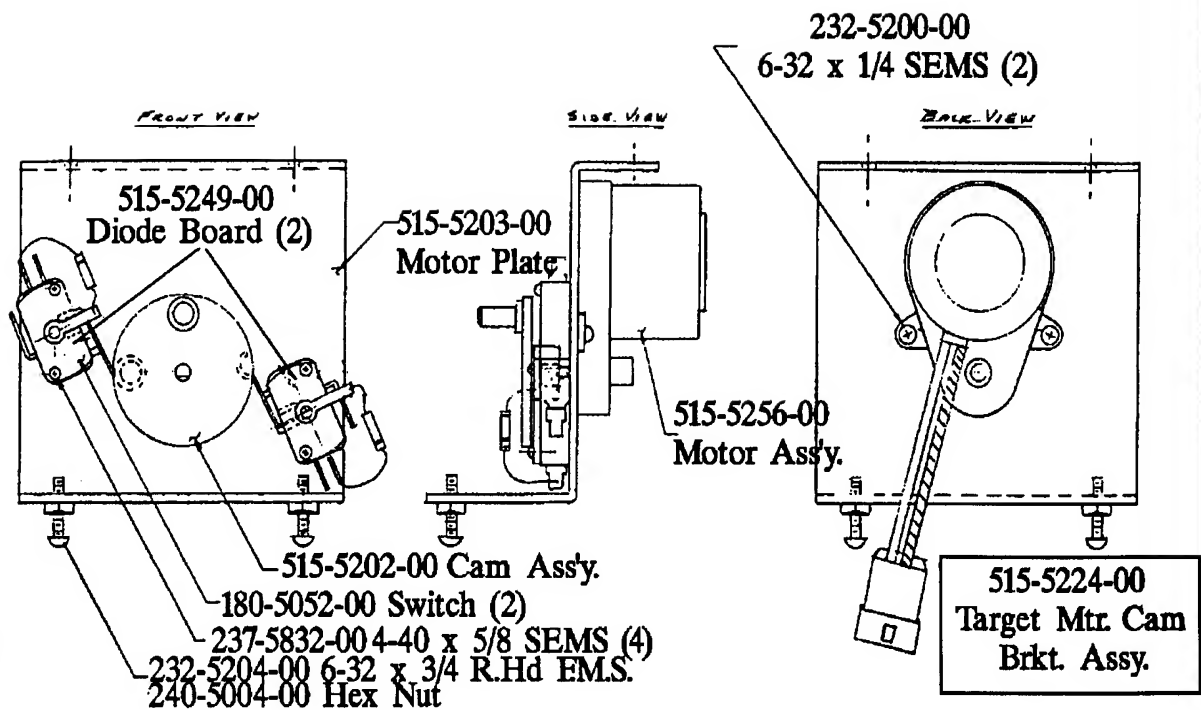
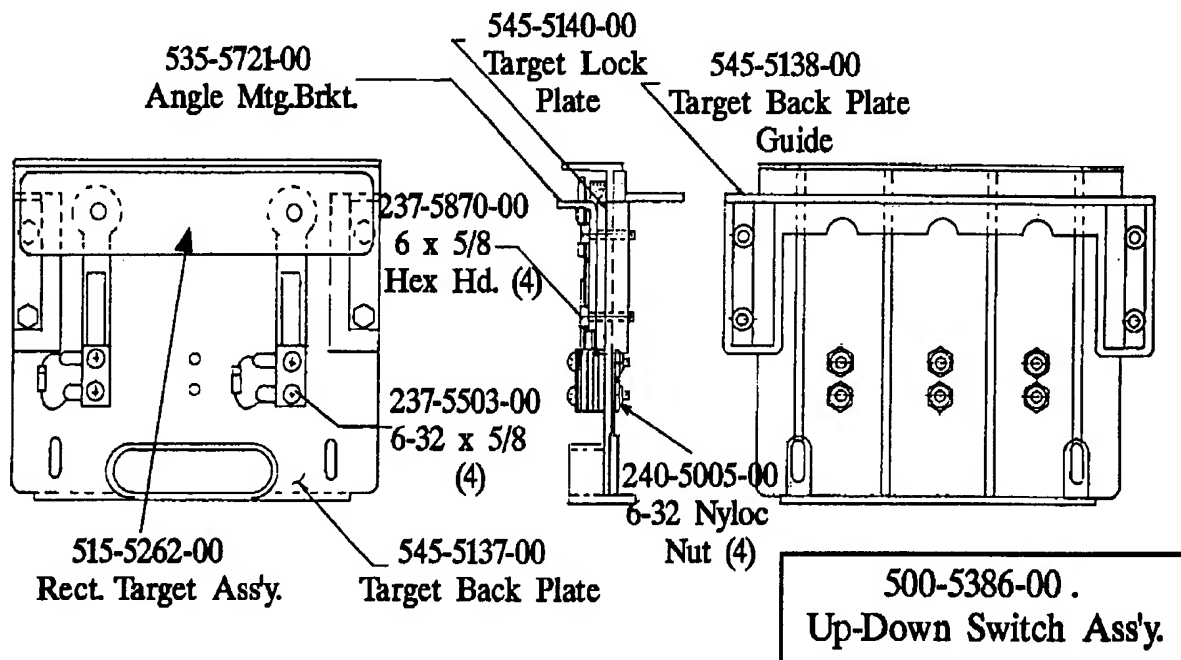


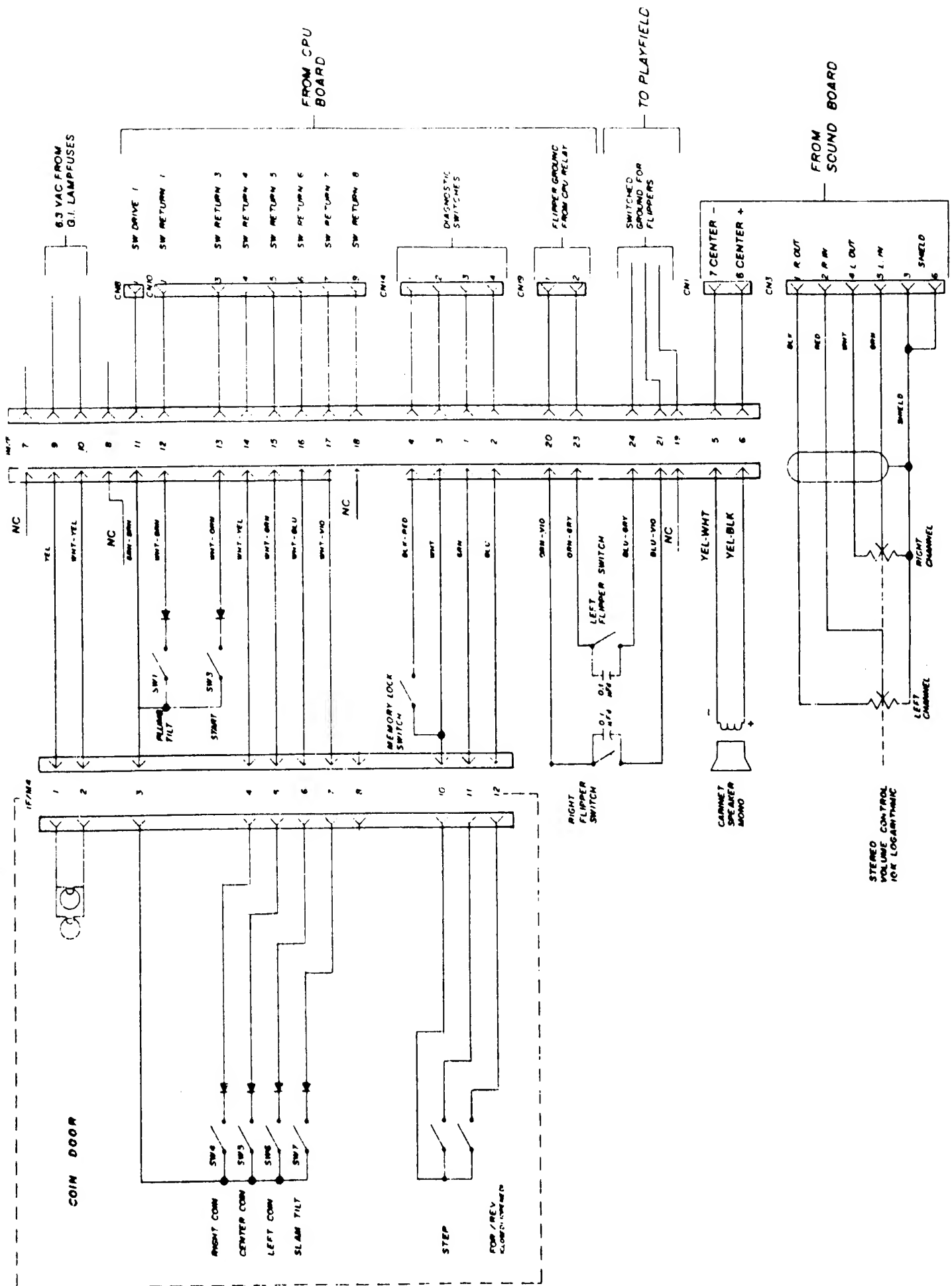


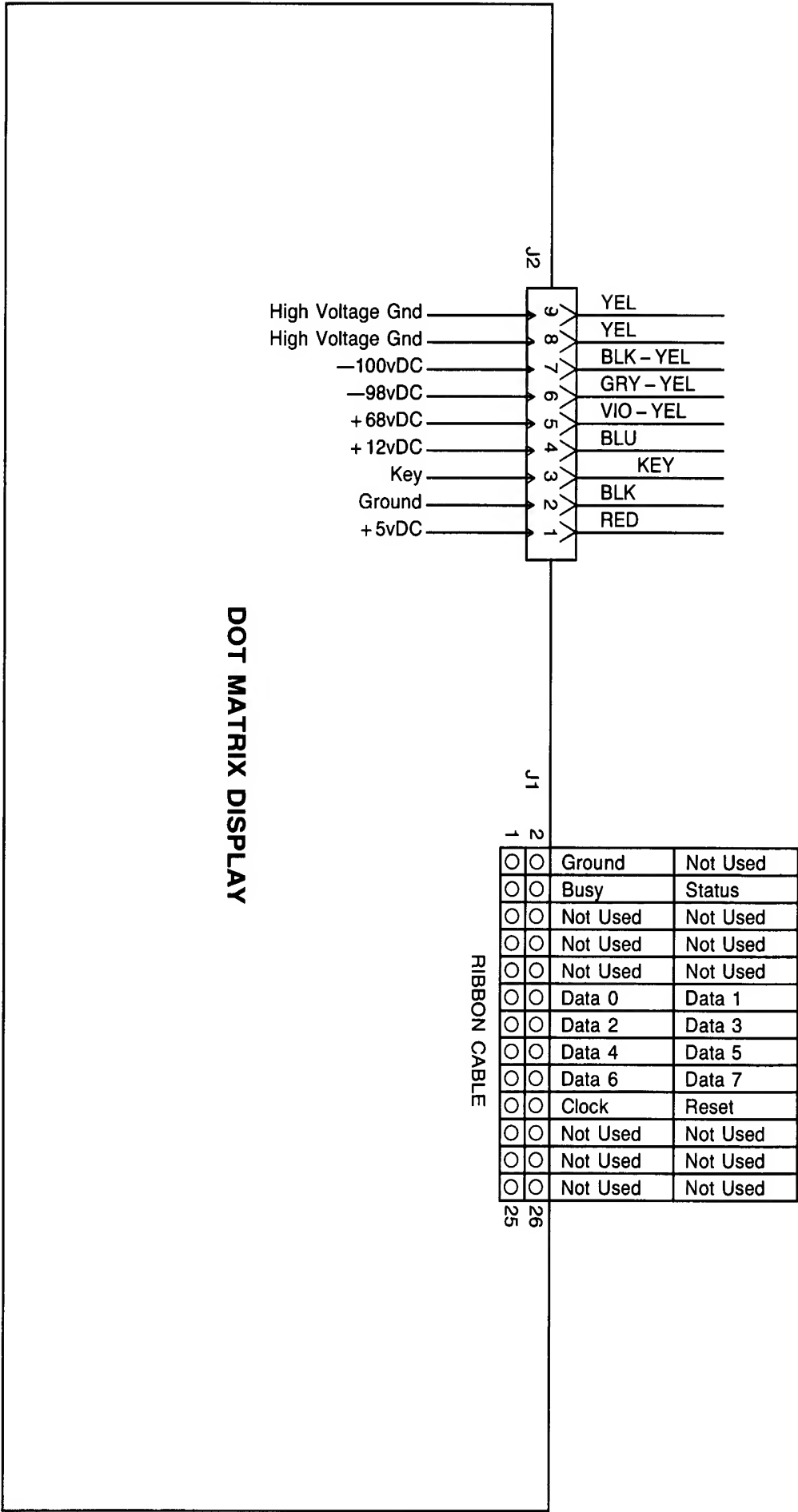
KICKBACK ASSEMBLY 500-5080-00 (COIL LUGS ON THE SIDE)
 KNOCKER ASSEMBLY 500-5081-00 (PICTURED)





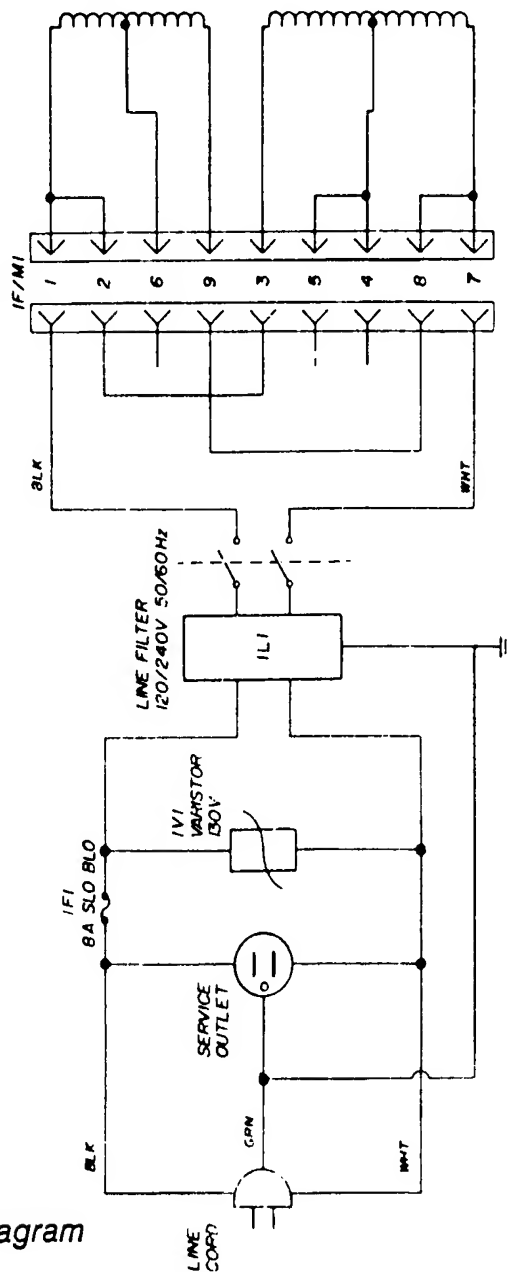






THIS CONFIGURATION FOR 115V

FOR LOWER LINE VOLTAGES
OR 230 VOLT OPERATION
SEE SAMPLES BELOW

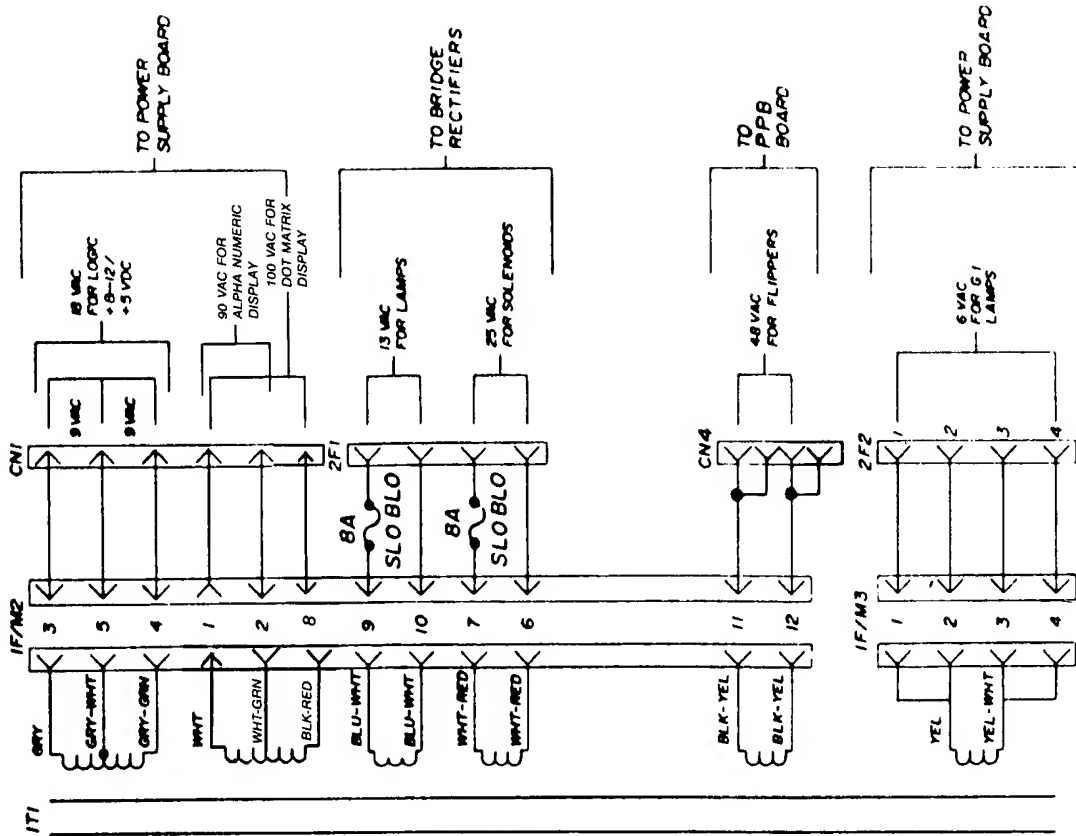
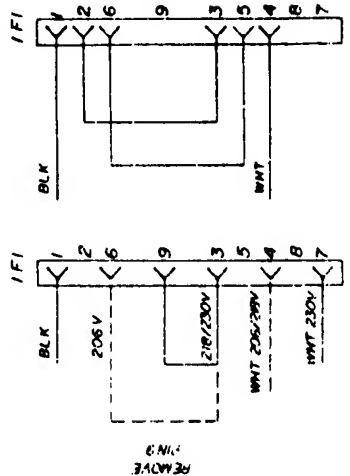


JUMPERS FOR VOLTAGE VARIATION

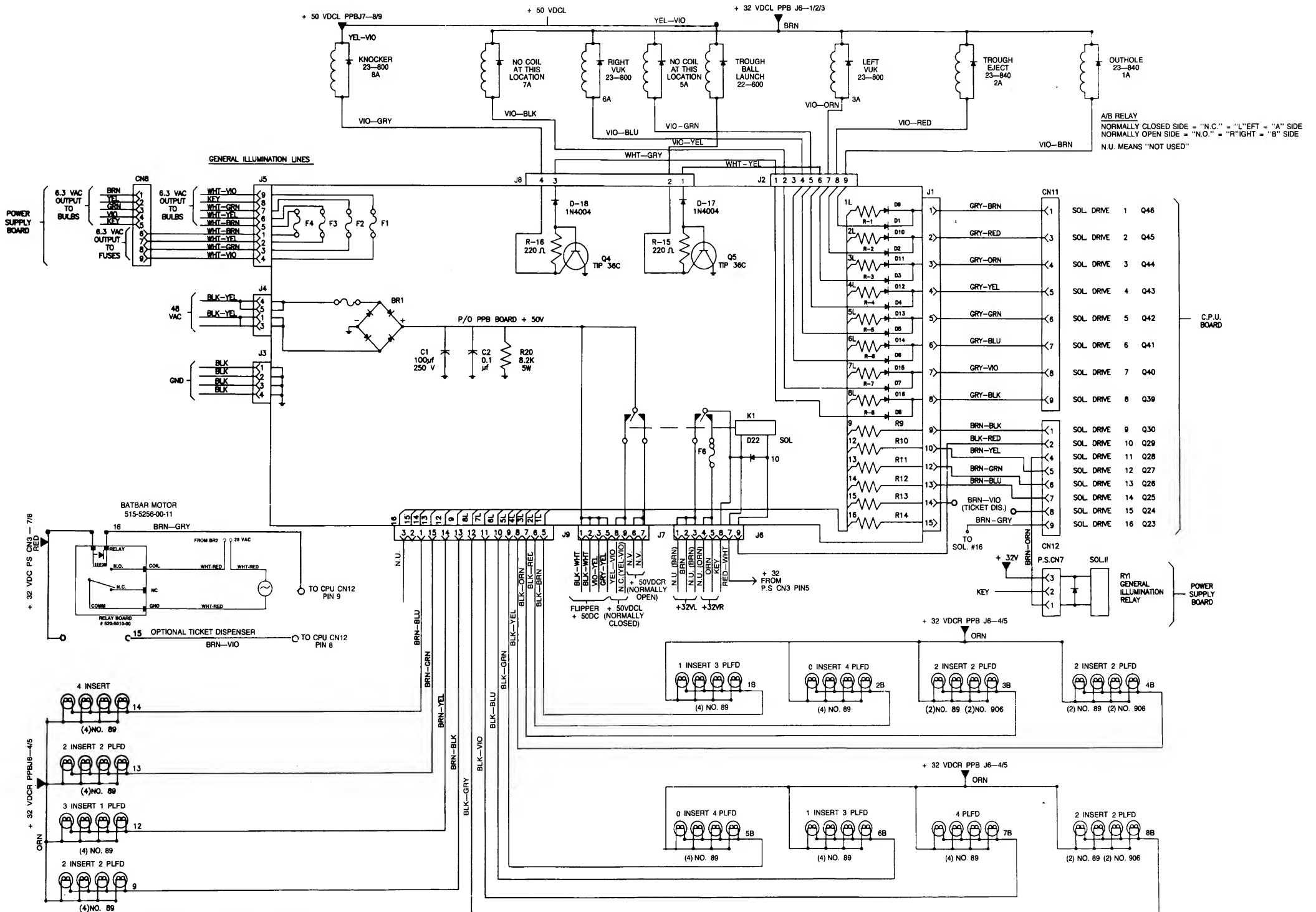
230/218/206 VOLTS 100/105 VOLTS

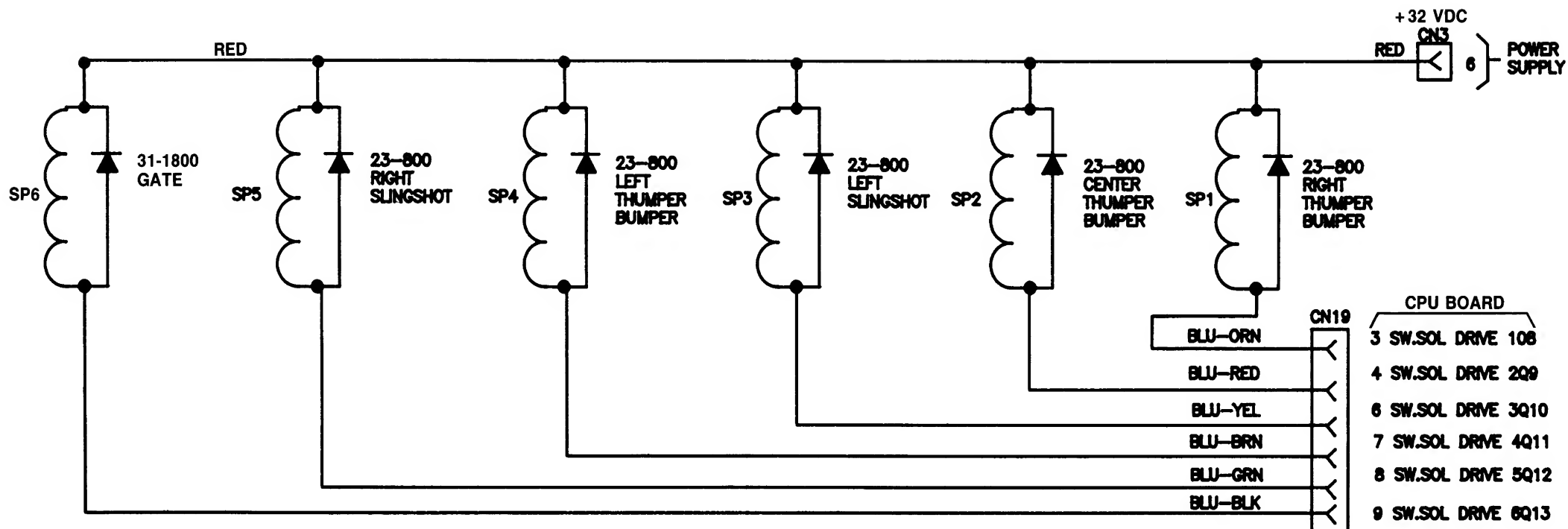
IF1 - 4A SLO BLO IF1 - 8A SLO BLO

IV1 - 275V VARISTOR IV1 - 130V VARISTOR





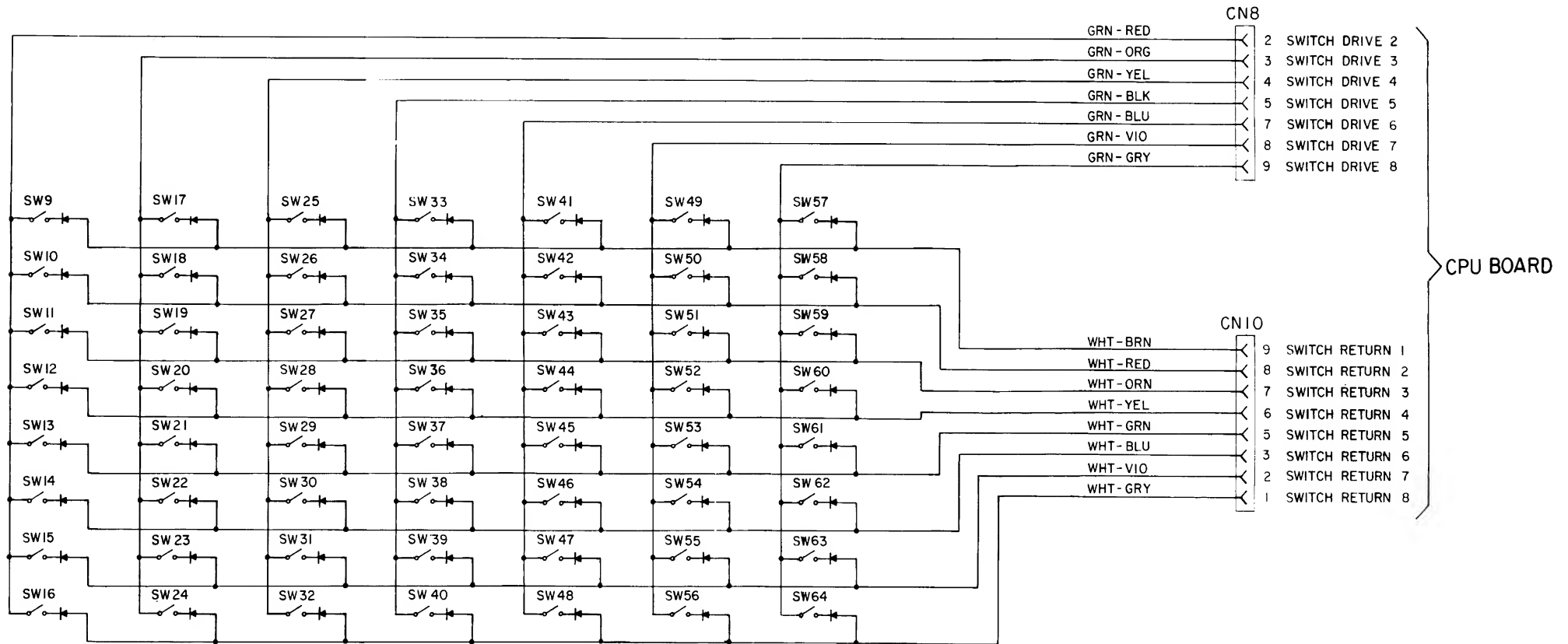




**Switch
Number Description**

01*	Plumb Tilt	16	Right Flip. Cab. Switch	31	Not Used	46	Not Used
02	Not Used	17	Left Top Lane	32	Not Used	47	Left Slingshot Sw. (2)
03	Credit Button	18	Center Top Lane	33	Left Bank Top	48	Right Slingshot Sw. (2)
04*	Right Coin	19	Right Top Lane	34	Left Bank Middle	49	Bat Bar StandupTarget
05*	Center Coin	20	Not Used	35	Left Bank Bottom	50	Museum Motor Up
06*	Left Coin	21	Left Return Lane	36	Joker Left Eye	51	Museum Motor Down
07*	Slam Tilt	22	Right Return Lane	37	Joker Right Eye	52	Right VUK Top
08	Not Used	23	Left Outlane	38	Joker Mouth	53	Right VUK Bottom
09	Not Used	24	Right Outlane	39	Left VUK	54	Bumper Left
10	Out Hole	25	Not Used	40	Not Used	55	Bumper Center
11	Trough #1(Left)	26	Not Used	41	Right 3 Bank Top	56	Bumper Right
12	Trough #2(Center)	27	Not Used	42	Right 3 Bank Middle	57	Not Used Through 64
13	Trough #3(Right)	28	Ramp Entrance	43	Right 3 Bank Bottom		
14	Shooter Lane	29	Ramp Exit	44	Not Used		
15	Left Flip. Cab. Switch	30	Not Used	45	Not Used		

* Indicates cabinet switches.



Lamp Number Description

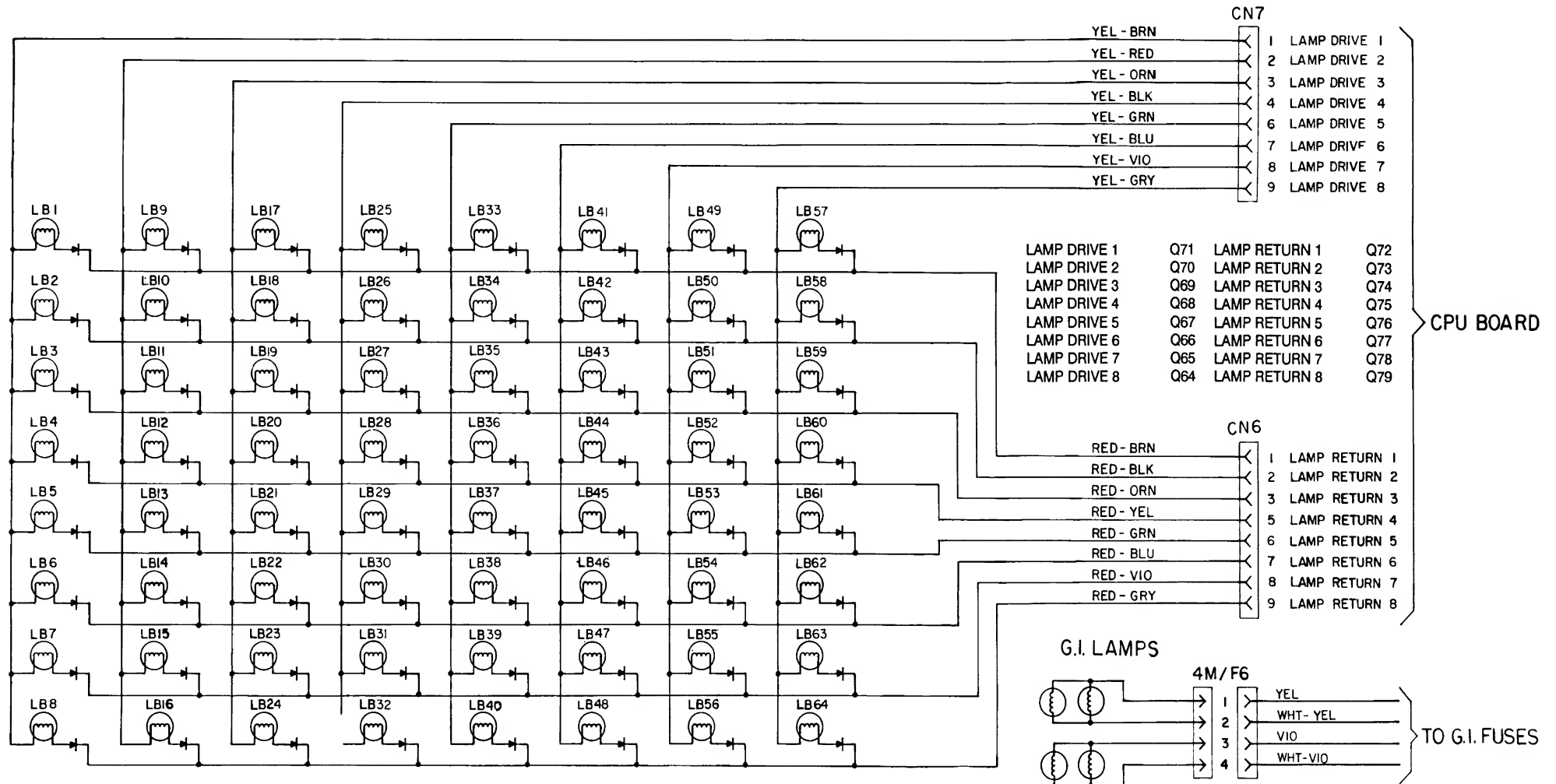
01. 1 Million
02. Super Bumps
03. Lite Xball
04. Fast Money
05. Instant 2 Ball
06. Million Plus
07. Max X Value
08. Spot Fast Money
09. Bottom 2X
10. Bottom 4X
11. Bottom 6X
12. Bottom 8X
13. Bottom 10X
14. Shoot Again
15. Batman's Head
16. Batman's Chest

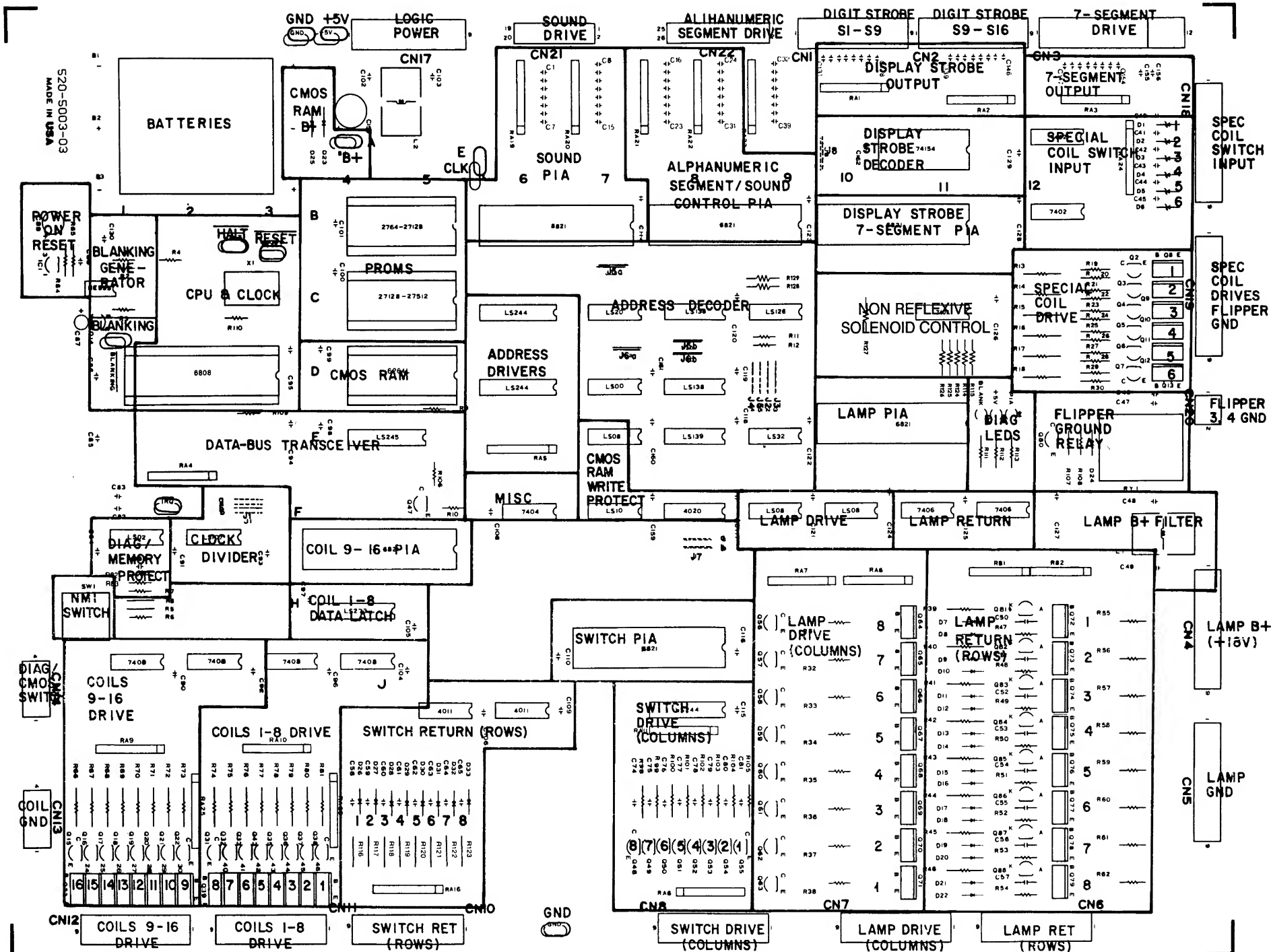
17. Left Toplane
18. Center Toplane
19. Right Toplane
20. Playfield Moon
21. Left Return Lane
22. Right Return Lane
23. Left Outlane
24. Right Outlane
- 25.* Backpanel Left
- 26.* Backpanel Center
- 27.* Backpanel Right
- 28.* Backpanel 500K
- 29.* Backpanel XBall
30. Double Score
31. Under Ramp XBall
32. 3 Million

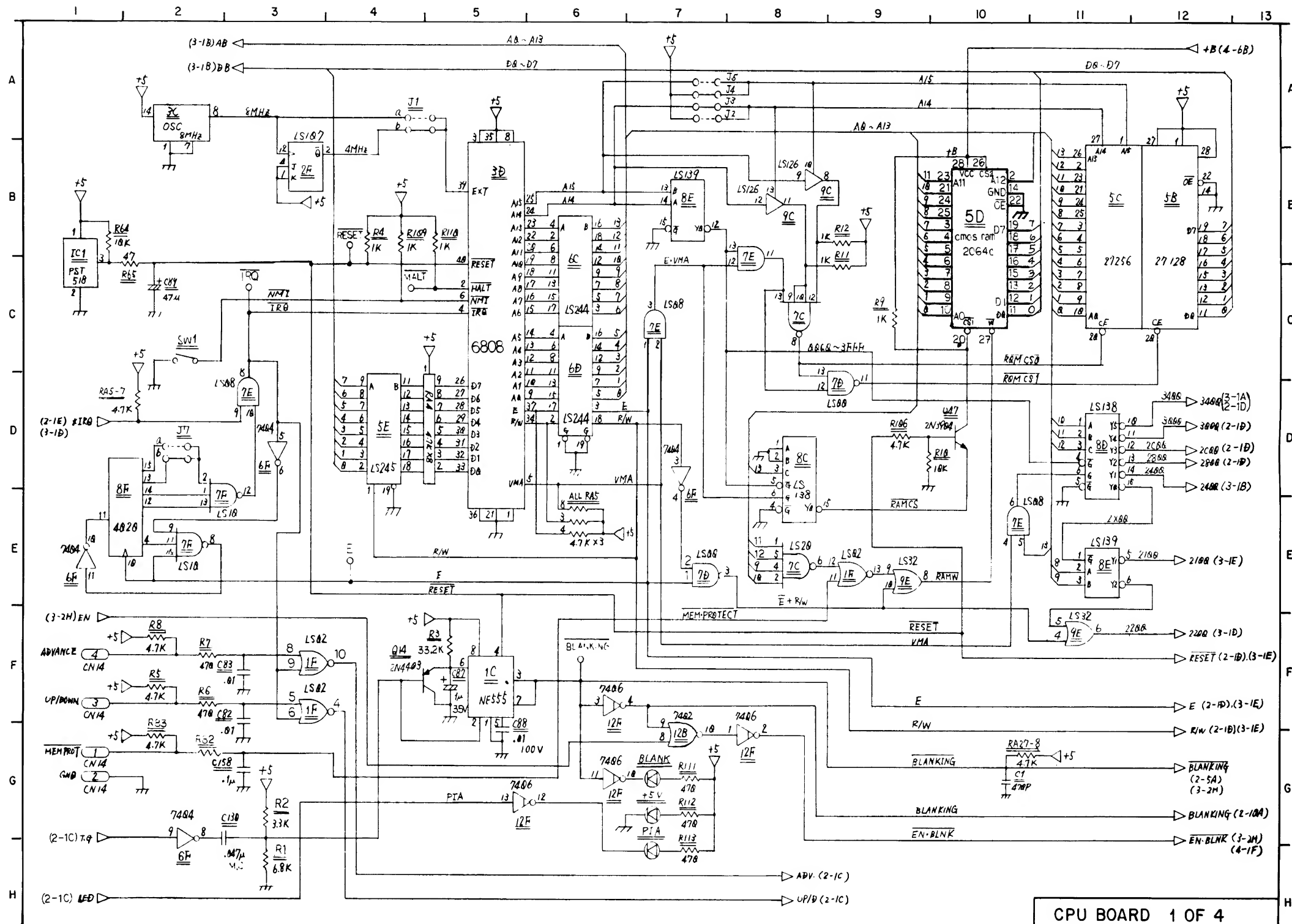
*Indicates Speaker or Backbox Lamp

33. Left 3 Bank Top
34. Left 3 Bank Middle
35. Left 3 Bank Bottom
36. Joker Left Eye
37. Joker Right Eye
38. Joker 2 Million
39. Left VUK Extra Ball
40. Left 3 Bank Done
41. Right 3 Bank Top
42. Right 3 Bank Middle
43. Right 3 Bank Bottom
44. Left Bumper
45. Center Bumper
46. Right Bumper
47. Spot Bat Monitor
48. Right 3 Bank Done

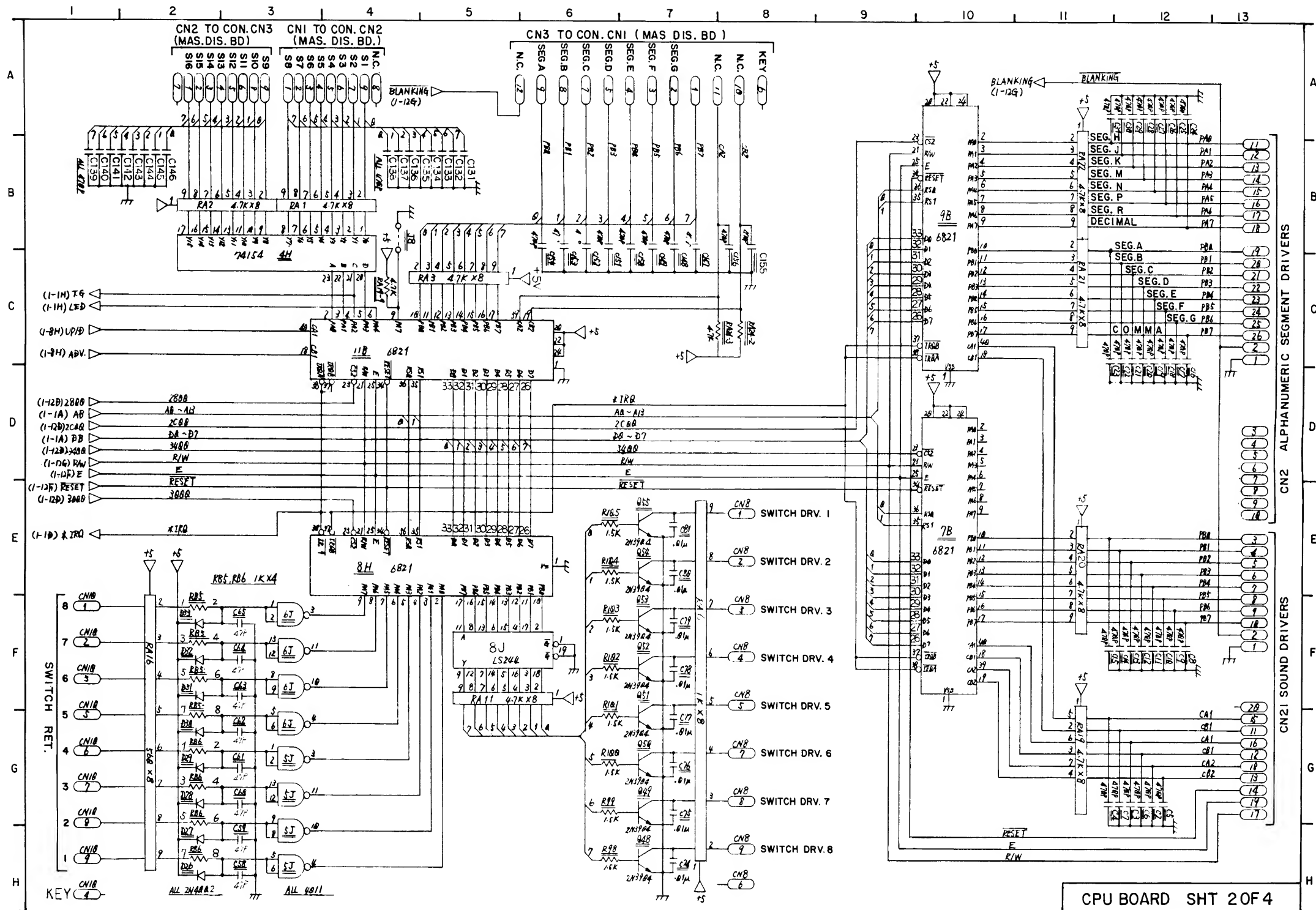
49. Ramp Diverter
- 50.* Insert-Moon (2)
- 51.* Insert-5 Million
- 52.* Insert-15 Million
- 53.* Insert-10 Million
54. Cab.-Start Button
55. Museum Bat Symbol
56. Jackpot Lit
57. BATMAN
58. BATMAN
59. BATMAN
60. BATMAN
61. BATMAN
62. BATMAN
63. Lock Ball #1
64. Lock Ball #2

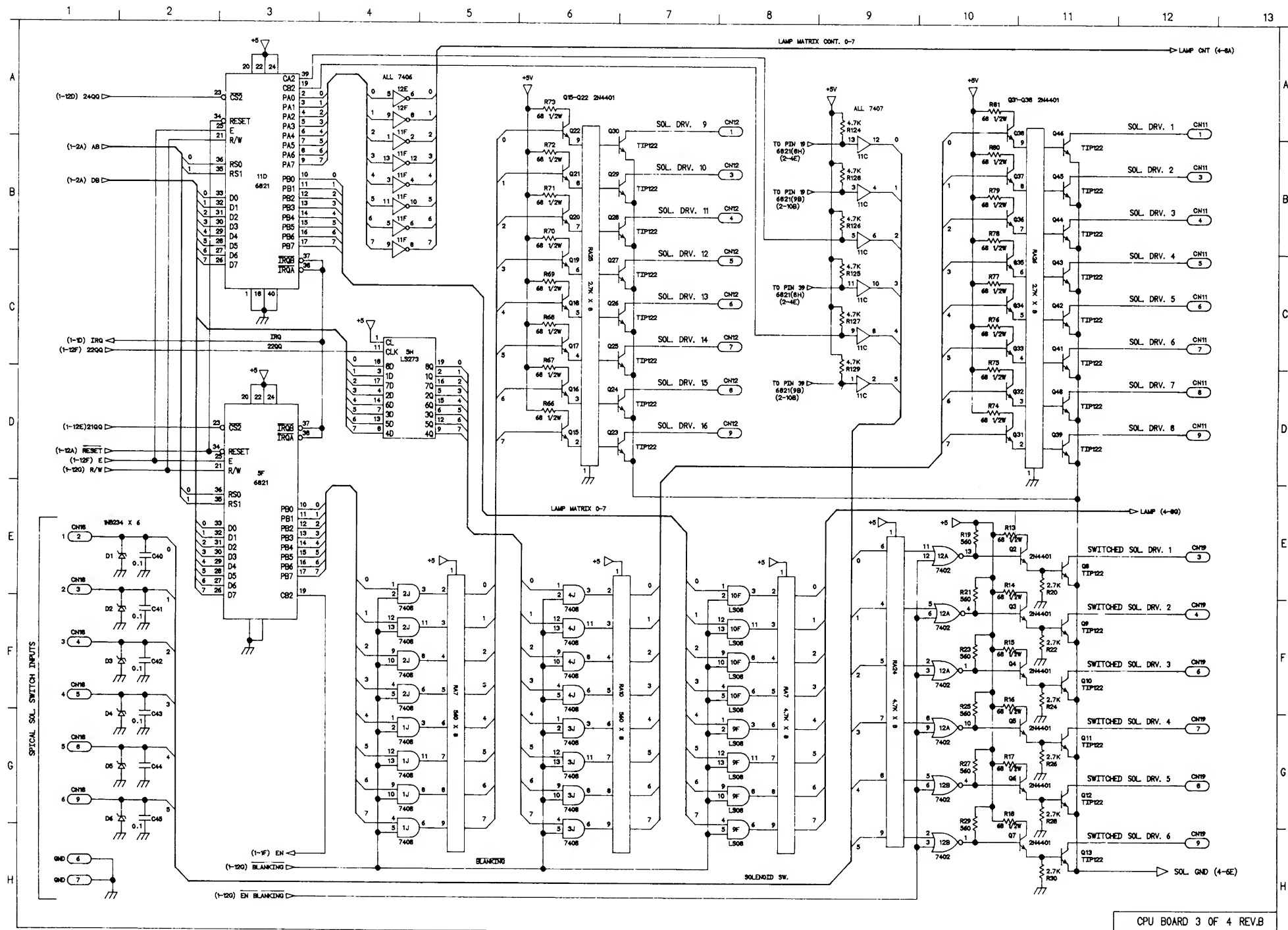




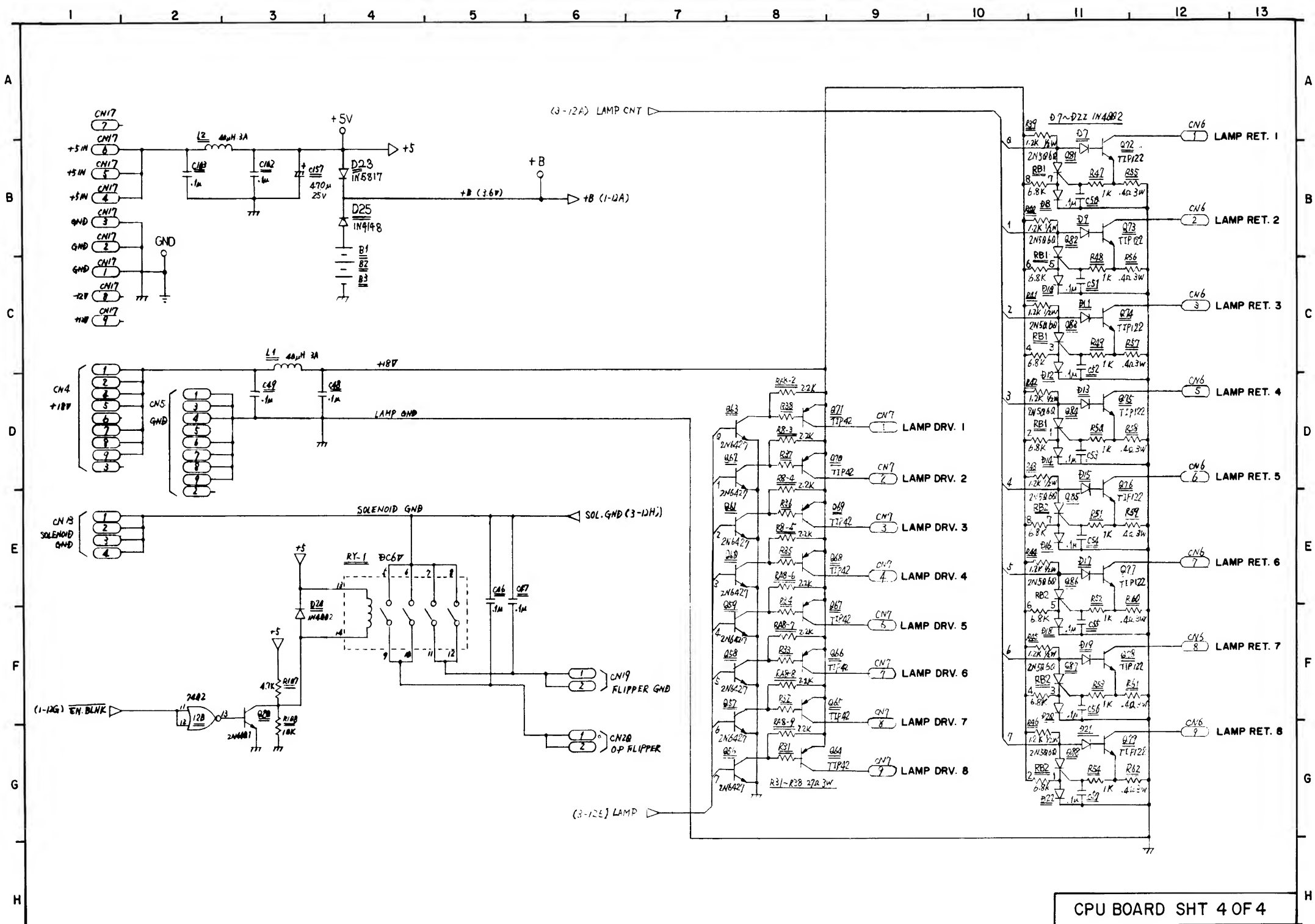


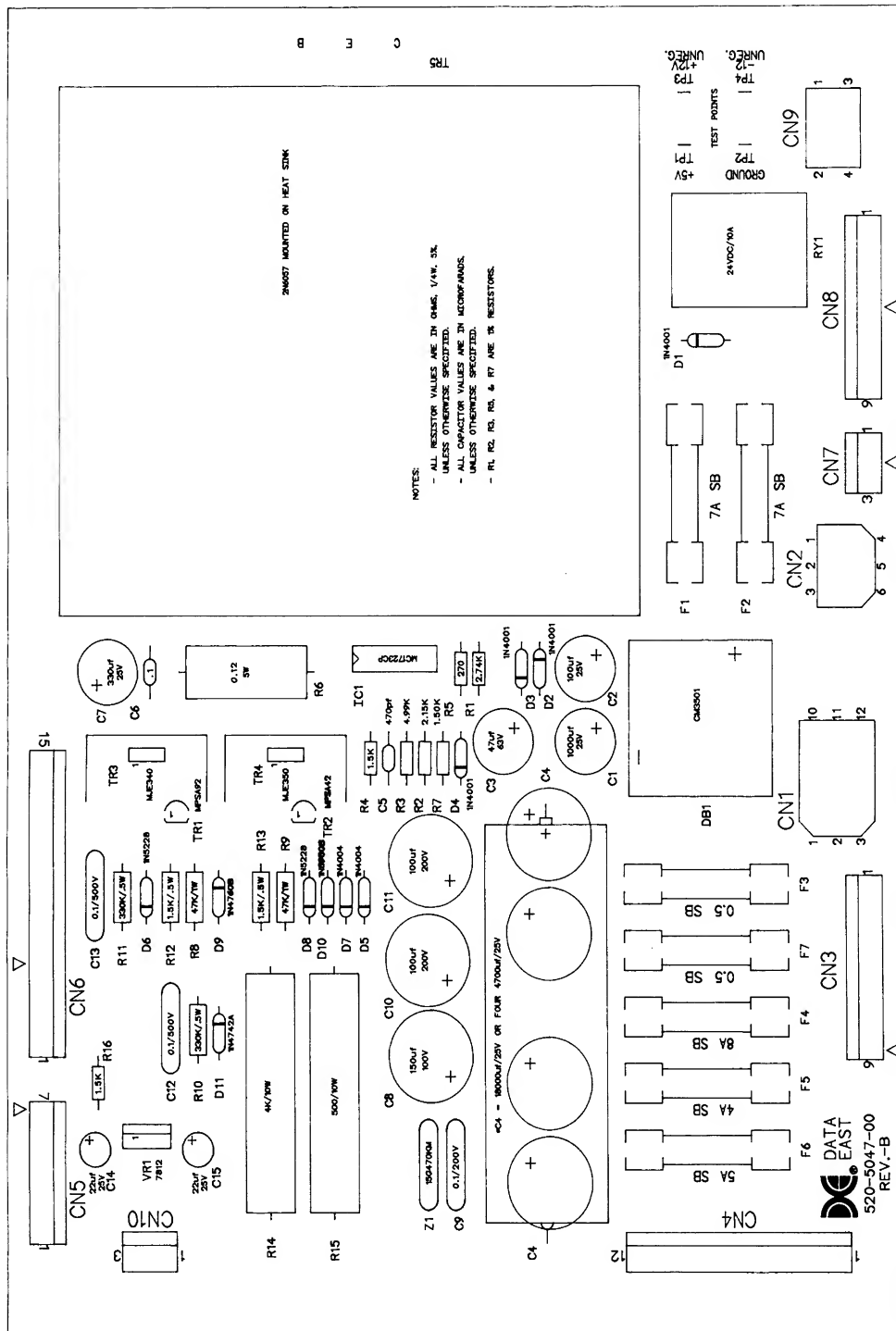
CPU BOARD 1 OF 4

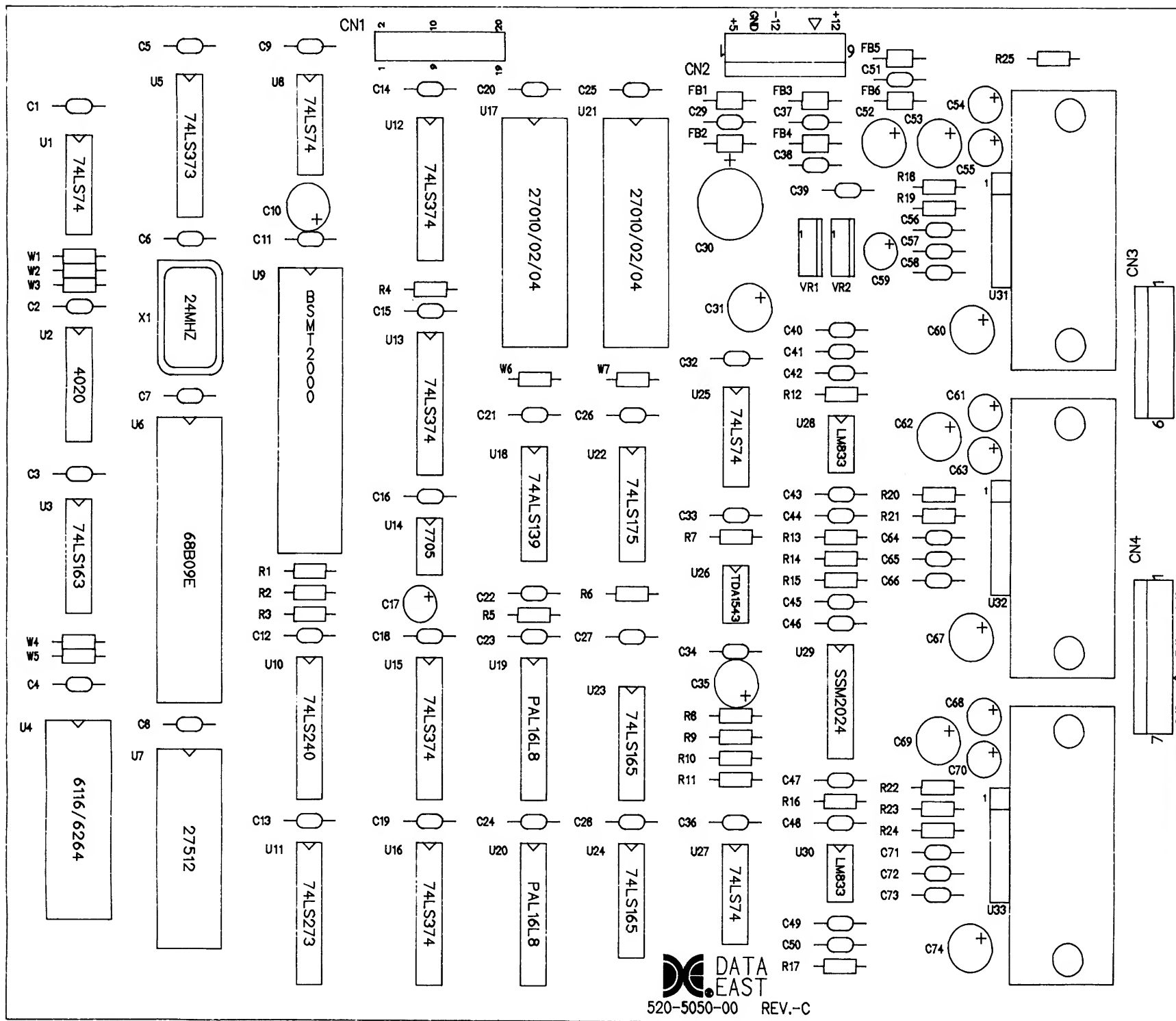


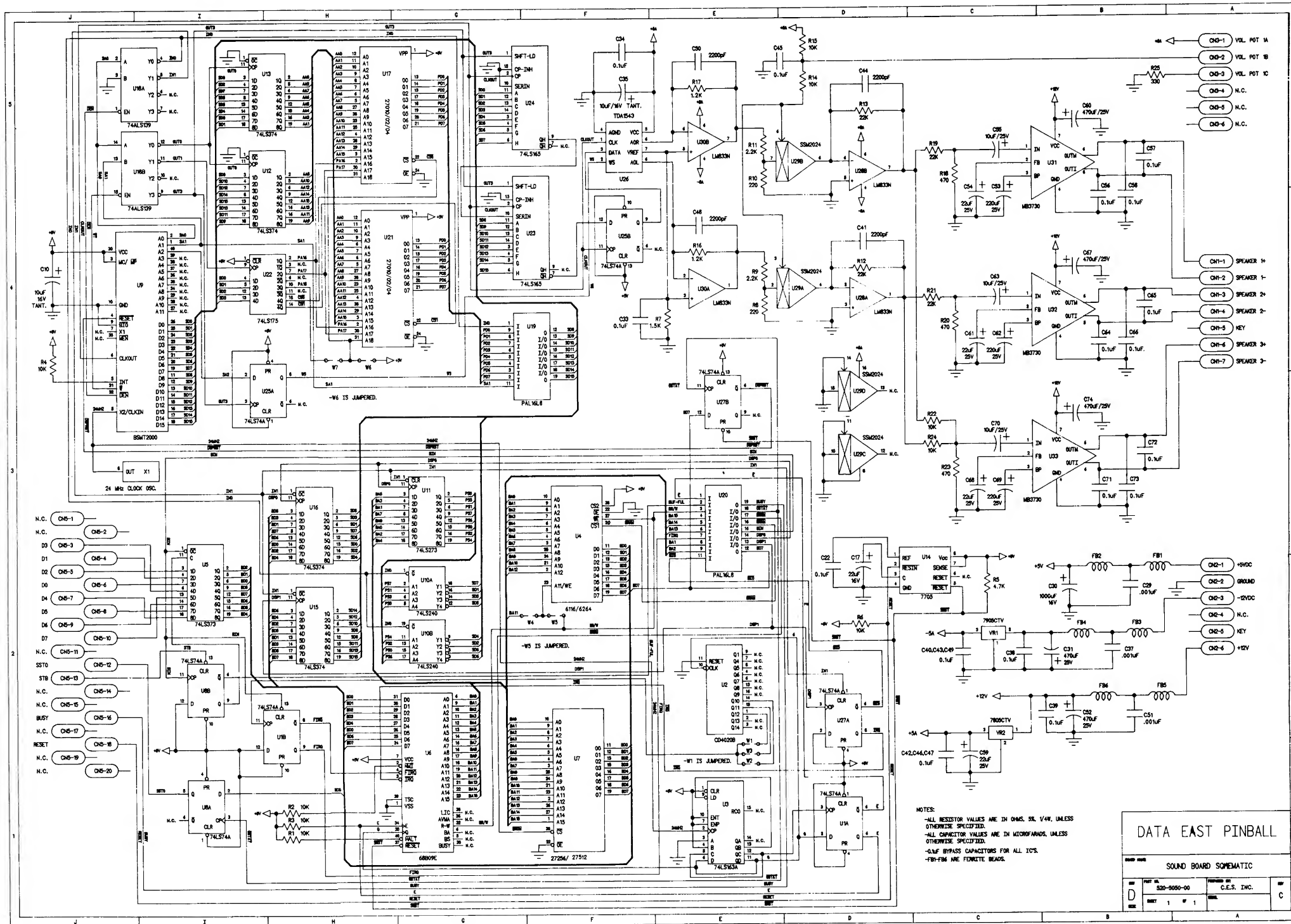


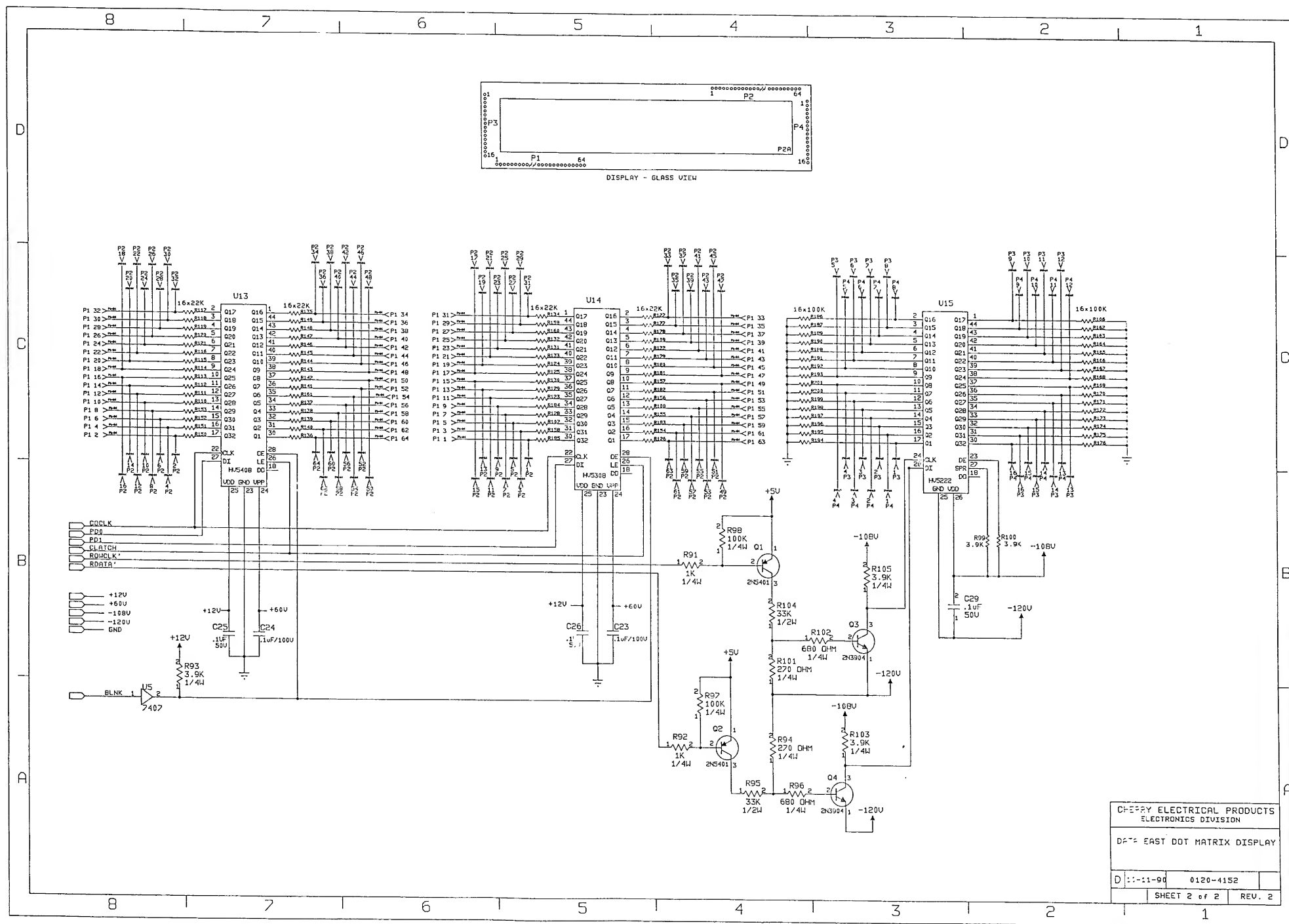
CPU BOARD 3 OF 4 REV.B

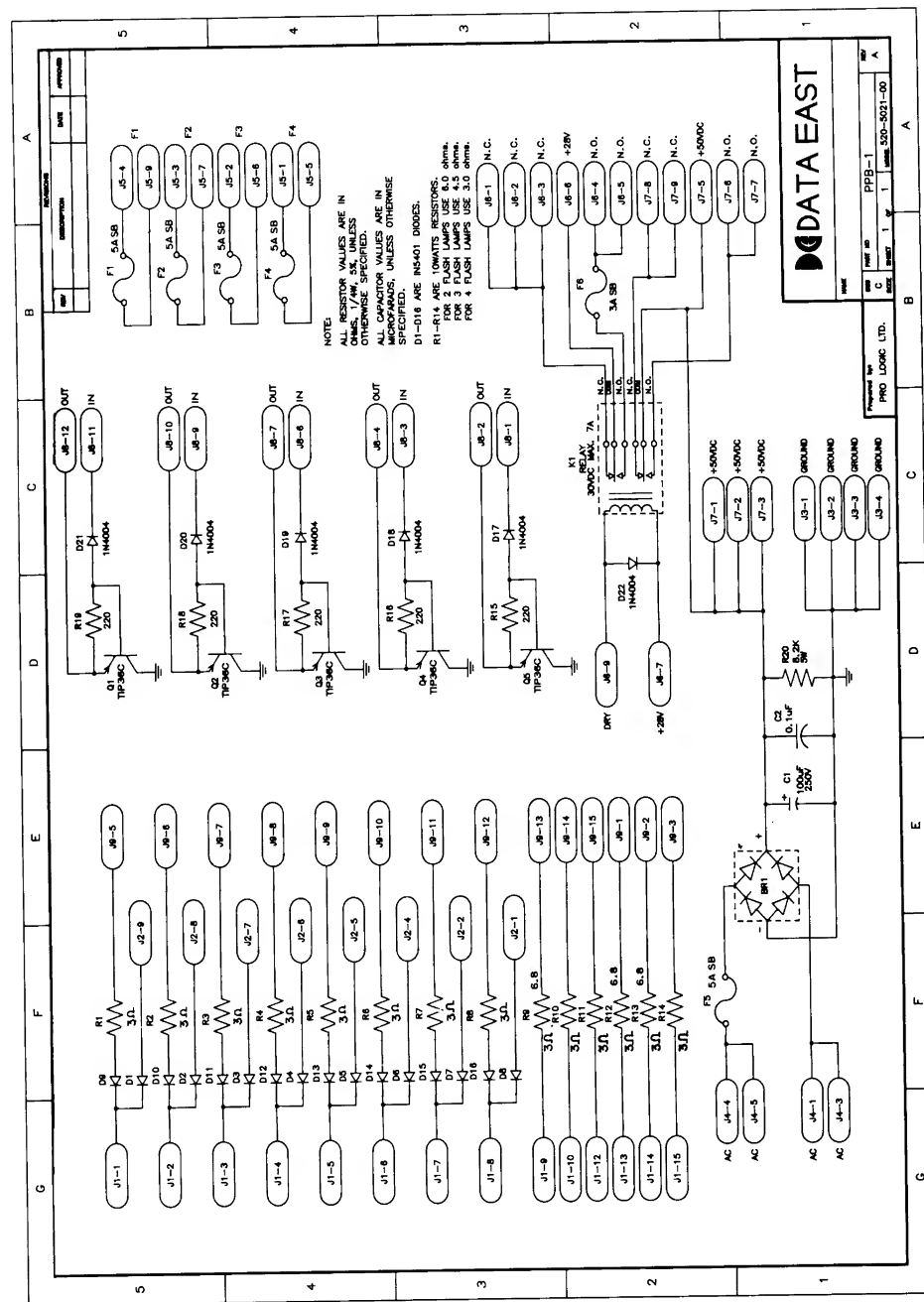
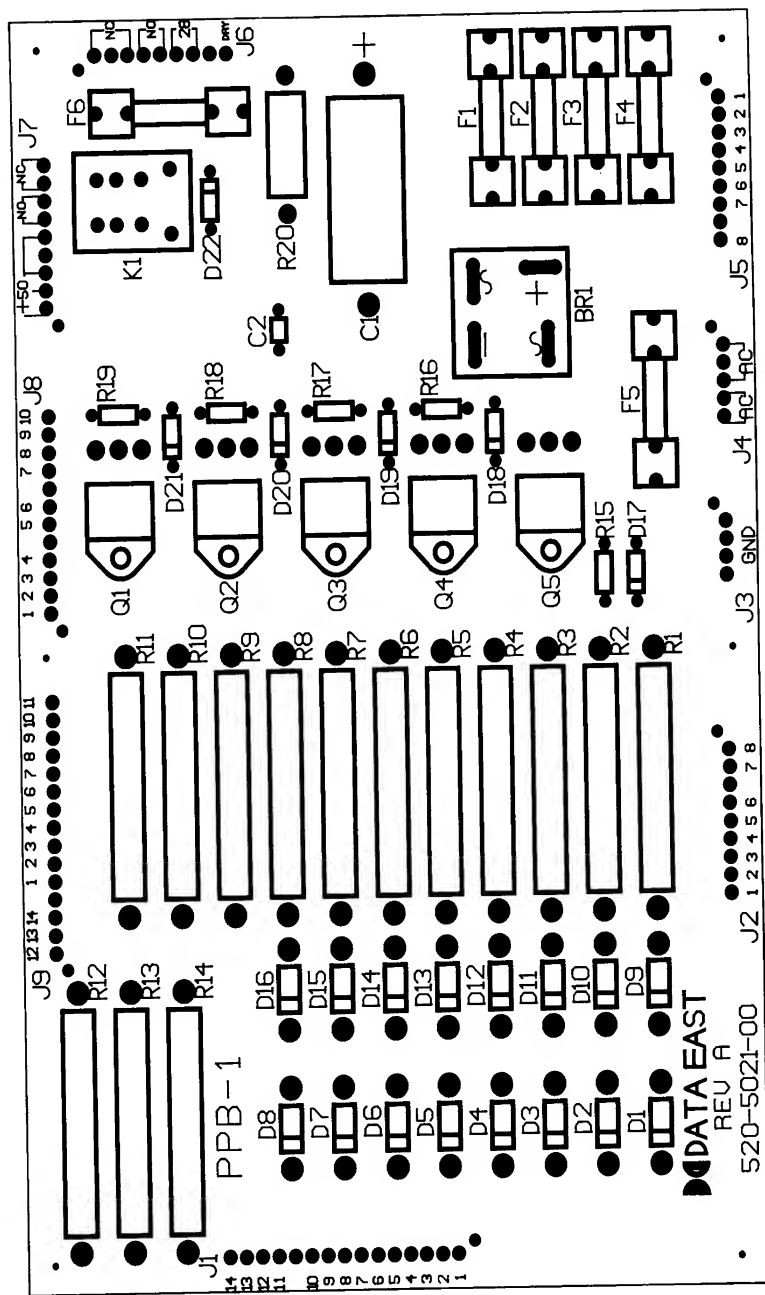














Theory of Operation for the Solid State Flippers

- The solid state flipper board is a dual flipper solenoid driver circuit. Each solenoid driver circuit contains a one shot timer, a 50V driver, and an 8V driver.

Looking at one circuit, Schmidt NAND gates U1A, U1B, and U1D make up the one shot timer. The timer length is controlled by R10, R33 and C2. The output of the timer is gated at U1C with the buffered switch input from Q6. The output of U1C controls the 50V driver circuit consisting of Q4, Q1, Q2, Q3, and D1. As long as the flipper button is activated, Q6 will keep the 8V driver circuit, SR1, on.

The 50V provides the actuation power to the flipper solenoid while the 8V provides the holding power.

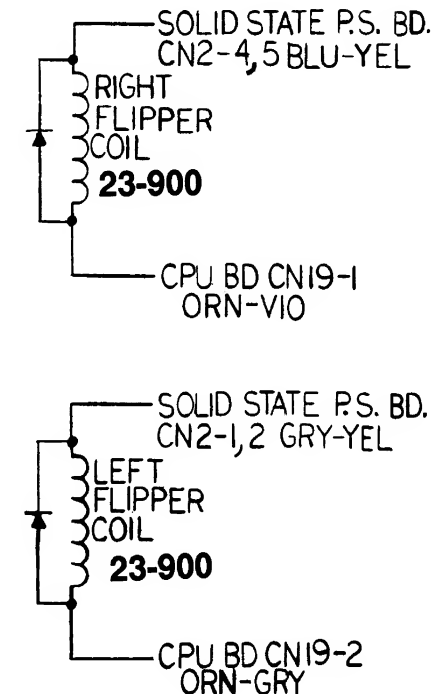
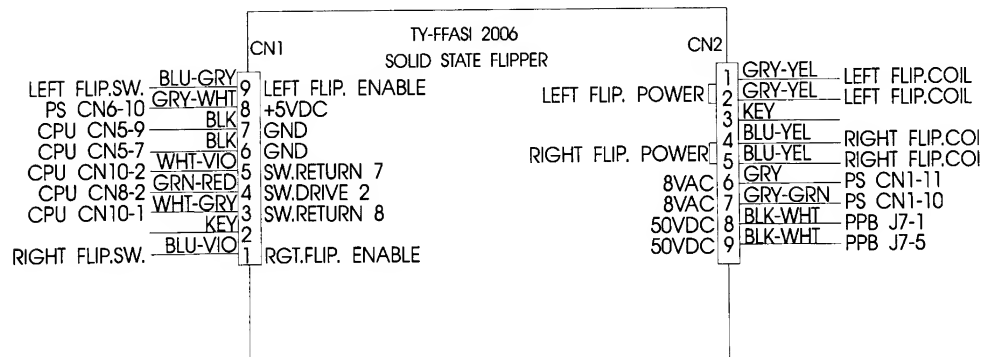
Solid State Flippers PCB Wiring Diagram

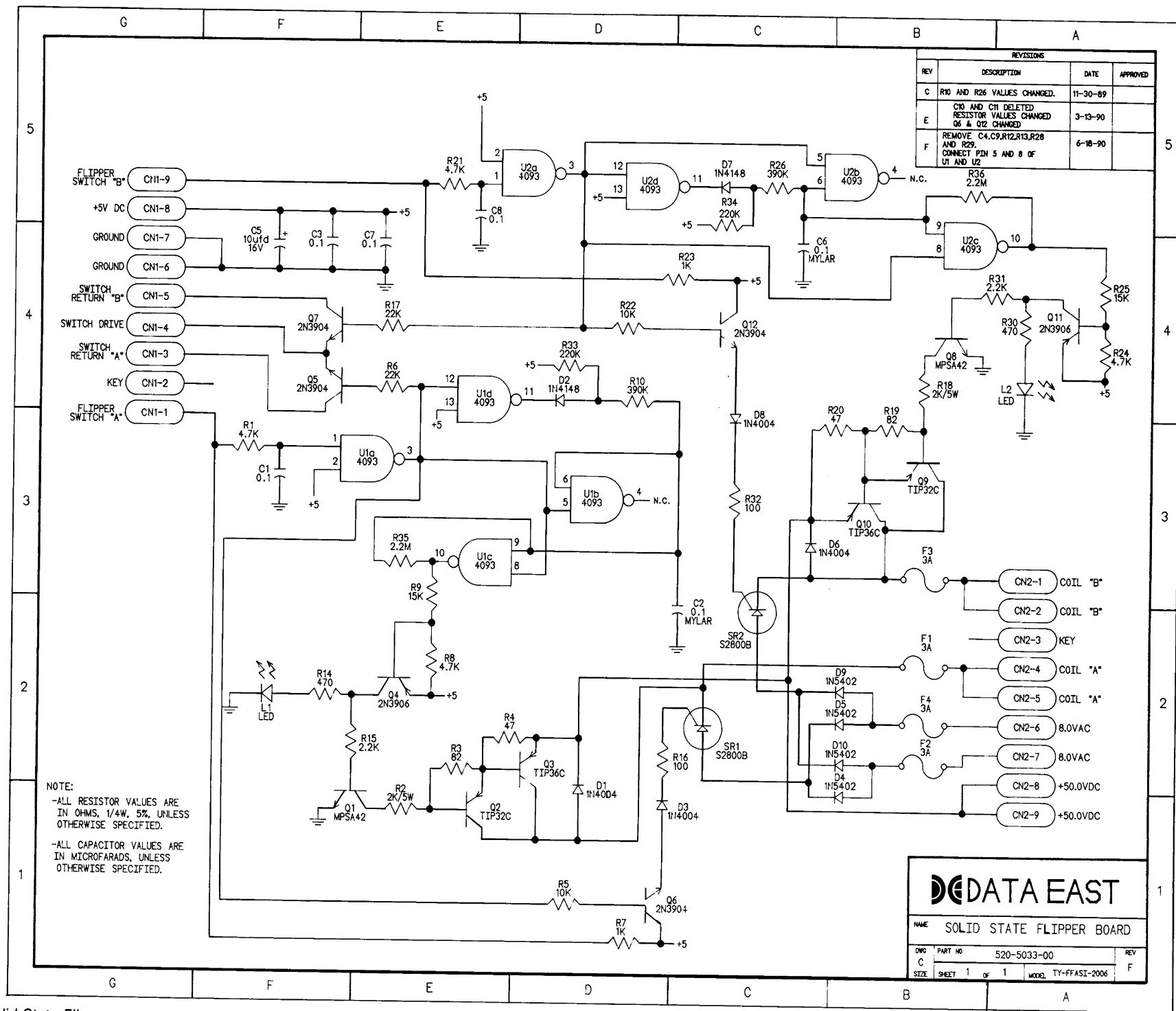
Connector CN 1

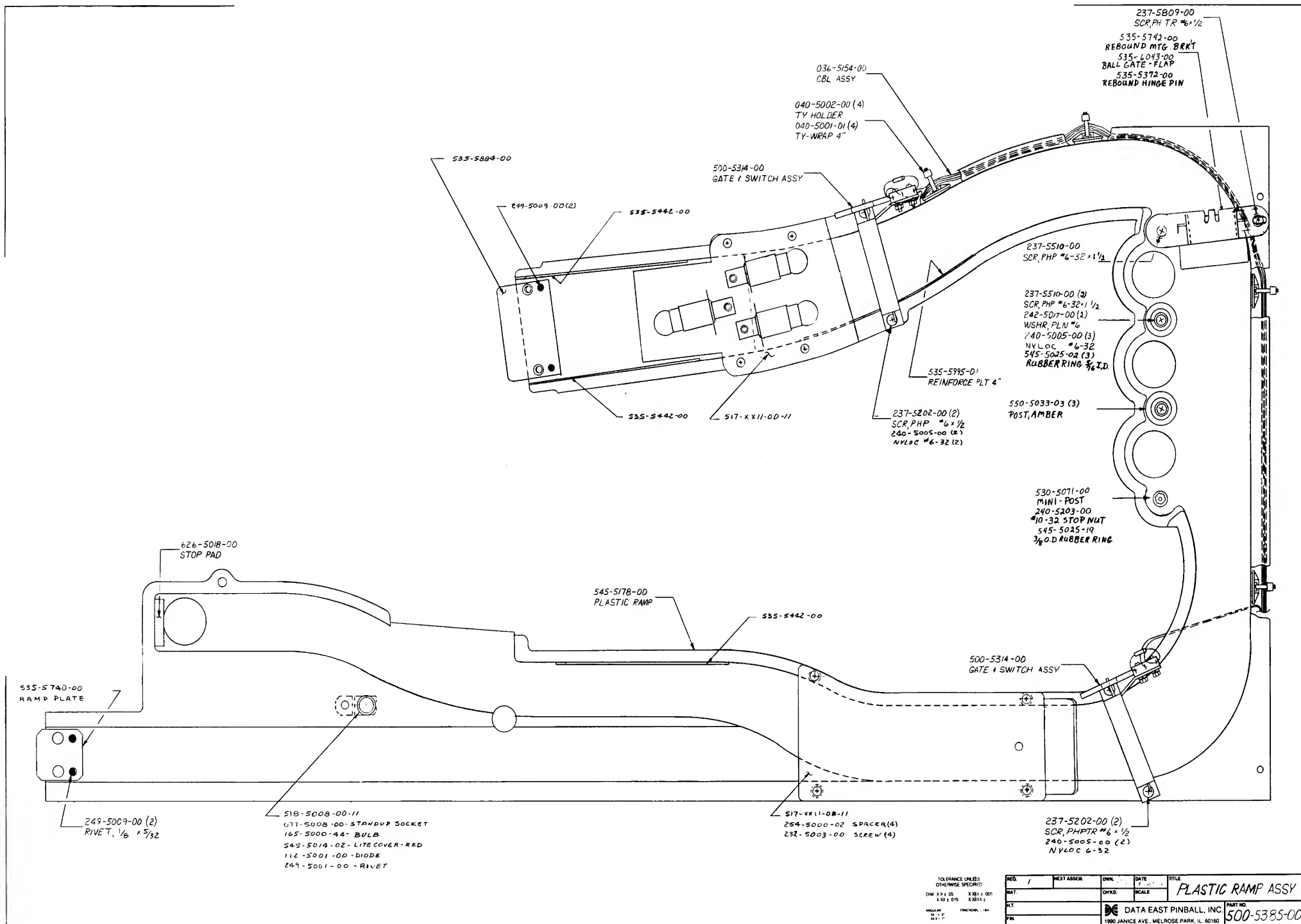
Pin #	Goes To	Wire Color	It Is
1	Rgt. Flipper Sw.	BLU-VIO	RGT. FLIP ENABLE
2			KEY
3	CPU CN10-1	WHT-GRY	SW. RET 8
4	CPU CN8-2	GRN-RED	SW. DRV 2
5	CPU CN10-2	WHT-VIO	SW. RET 7
6	CPU CN5-7	BLK	GND
7	CPU CN5-9	BLK	GND
8	PS CN6-10	GRY-WHT	+5VDC
9	Lft. Flipper Sw.	BLU-GRY	LFT. FLIP ENABLE

Connector CN 2

Pin #	Goes To	Wire Color	It Is
1	Lft. Flip Coil	GRY-YEL	LFT. FLIP POWER
2	****	****	****
3	Rgt. Flip Coil	BLU-YEL	RGT. FLIP POWER
4	****	****	****
5			KEY
6	PS CN1-11	GRY	9 VAC
7	PS CN1-10	GRY-GRN	9 VAC
8	PPB J7-1	BLK-WHT	50 VDC
9	PPB J7-5	BLK-WHT	50 VDC





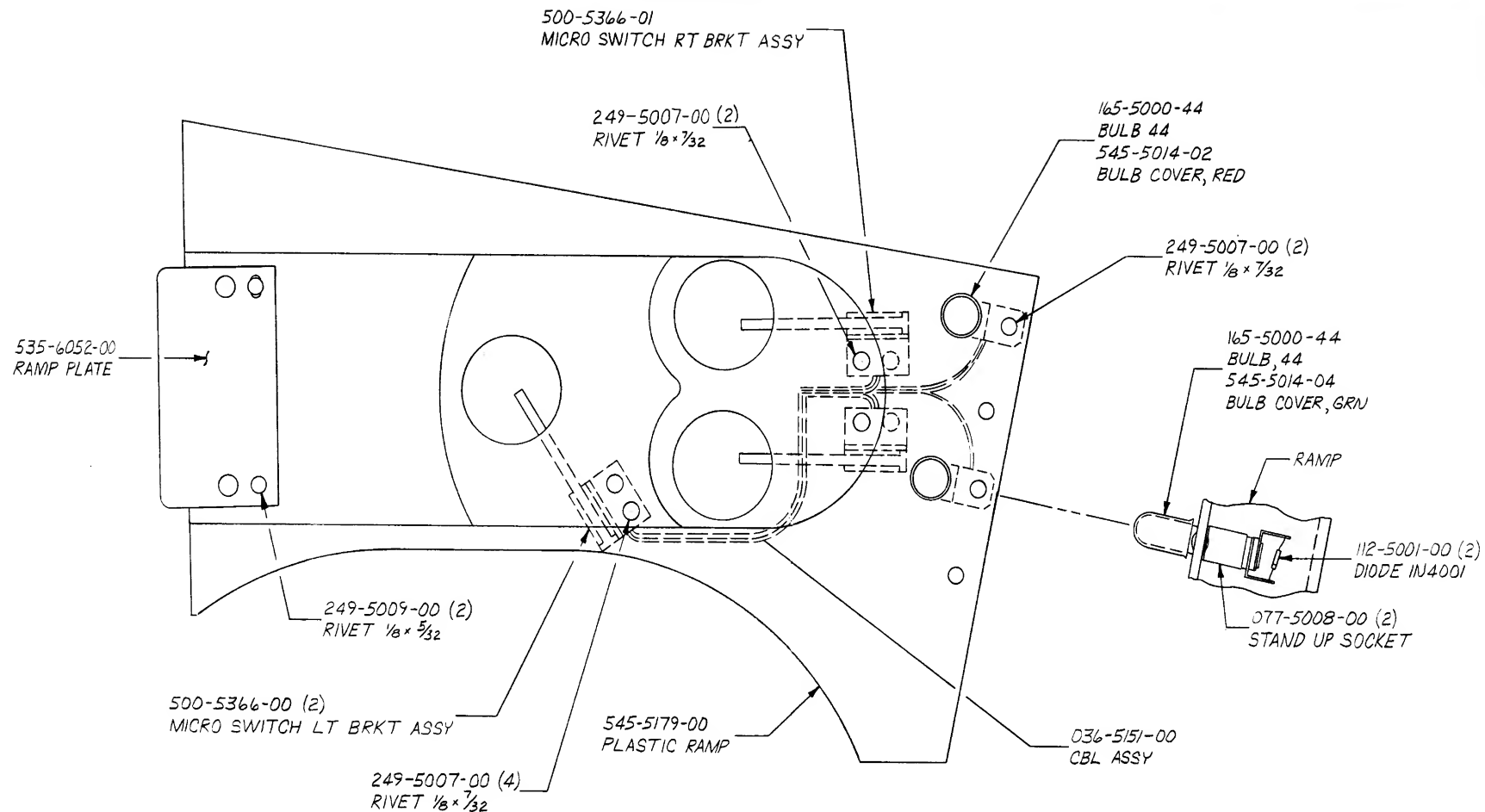


TOLERANCE UNLESS OTHERWISE SPECIFIED:
 DIM. X.X ± .05 X.XX ± .01
 X.XX ± .015 X.XXX ± .01
 ANGULAR .01" ± .01
 HOLE .01" ± .01

REV.	DATE	BY	CHKD.	SCALE	TITLE
1					PLASTIC RAMP ASSY

PART NO. 500-5385-00

DATA EAST PINBALL, INC.
 1900 JANICE AVE., MELROSE PARK, IL 60160



TOLERANCE UNLESS
OTHERWISE SPECIFIED

DIM XX ± .05 XXX ± .005
XX ± .015 XXXX ±

ANGULAR
XX ± 5°
XX ± 1°

FRACTIONAL ± 1/64

REQ. 1	NEXT ASSEMB.	DWN. 1/18	DATE 4-26-91	TITLE
MAT.	CHKD.	SCALE	JOKER RAMP ASSY	
HLT.	DATA EAST PINBALL, INC.		PART NO.	
FIN.	1990 JANICE AVE., MELROSE PARK, IL. 60160		500-5388-00	

DATA EAST LIMITED WARRANTY

Data East USA, Inc., ("Seller") warrants only to the Initial purchaser of its products that the items listed below are free from defects in material and workmanship under normal use and service for the warranty period specified:

PRINTED CIRCUIT BOARDS (GAME LOGIC) 60 DAYS

No other parts of Seller's product are warranted.

Warranty periods are effective from the initial date of shipment from Seller to its authorized distributors.

Seller's sole liability shall be, at its option, to repair or replace products which are returned to Seller during the warranty periods specified, provided:

1. Seller is notified promptly upon discovery by purchaser that stated products are defective.
2. Such products are properly packaged and then returned freight prepaid, to Seller's plant.

This warranty does not apply to any parts damaged during shipment and/or due to improper handling, or due to improper installation or usage, or alteration. In no event shall the Seller be liable for any anticipated profits, loss of profits, loss of use, accidental or consequential damages or any other losses incurred by the customer in connection with the purchase of a Data East USA., product.

WARRANTY DISCLAIMER

EXCEPT AS SPECIFICALLY PROVIDED IN A WRITTEN CONTRACT BETWEEN SELLER AND PURCHASER, THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

WARNING—This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

